



CIP
INTERNATIONAL
POTATO CENTER



Gutubura neza imbuto y'ibirayi mu Rwanda

Igitabo cy' amahugurwa

Byashyizwe ahagaragara na:

Ikigo mpuzamahanga cyita ku birayi (CIP)

Icyicaro gikuru: Avenida La Molina 1895, La Molina, Apartado Postal 1558, Lima, Peru

E cip@cgiar.org

I cipotato.org

Correct citation: CIP (2021). Gutubura neza imbuto y'ibirayi mu Rwanda • Igitabo cy' amahugurwa. International Potato Center (CIP), Lima, Peru.

Gushimira:

Iyi mfashanyigisho yakozwe ku bufatanye bw' Ikigo mpuzamahanga cyita ku birayi (CIP), Ikigo cy'igihugu gishinzwe guteza imbere ubuhinzi n'ubworozi mu Rwanda (RAB), hamwe n'umuryango w'abahinzi n'aborozi (Agriterra).

Iyi mfashanyigisho ishyizwe ahagaragara hifashishijwe zimwe mu nyandiko nka "Gutubura neza imbuto y'ibirayi muri Kameruni" yatewe inkunga na minisiteri y'Ubudage ishinze ubufatanye mu by'Ubukungu n'Iterambere (BMZ) igaragara ku <https://hdl.handle.net/10568/108468> under Creative Commons Attribution 4.0 International license (CC BY 4.0); Inyandiko zitandukanye zakozwe ku buhinzi bw'ibirayi ndetse n'ibitekerezo by'abahinzi b'ibirayi mu Rwanda.

Turashimira cyane ibitekerezo n'ubufatanye bw'abahagarariye: Umuryango w'Abahinzi n'Aborozi mu Rwanda "Imbaragara", Delphy, SPF-Ikigega, Rwandan Potato Stakeholders Platform, INES-Ruhengeri, UR-CAVM, Horizon-Sopyrwa, Akarere ka Musanze, Holland Greentech, Hollanda Fair Foods, HoReCo Rwanda, amahuriro y'abahinzi b'ibirayi bo mu turere twa Musanze, Nyabihu na Rubavu, n'amakoperative afashwa mu bujyanama na Agriterra ibinyujije mu "Imbaraga" iyi mfashanyigisho yateguwe ku nkungu y'Umuryango w'Abahinzi n'Aborozi "Agriterra"

Ahantu n'itariki byatangarijweho:

Kigali / Nyakanga 2021

Ishakiro

Imiterere y'iyi mfashanyigisho	3
Ibigize amahugurwa	3
Imfashanyigisho z'amahugurwa	4
Igitabo cy'amahugurwa	4
Imfashanyigisho y'amashusho	4
Imfashanyigisho y'umuhinzi	4
Imfashanyigisho nyobora	4
Iby'ibanze ku butubuzi bw'imbuta y'ibirayi	5
Igice cya 1: Uruhererekane nyongeragaciro rw'imbuta y'ibirayi	5
Igice cya 2: Ibiranga ikirayi cy'imbuta	6
Igice cya 3: Ubwiza bw'imbuta no kuzemeza	7
Igice cya 4: Gusimbuza imbuta	8
Igice cya 5: Kubika inyandaiko	9
Ubutaka no kwita ku gihingwa	10
Igice cya 6: Guhitamo ubutaka no gusimburanya ibihingwa	10
Igice cya 7: Gutegura umurima	11
Igice cya 8: Gufumbira (ifumbire y'amatungo, imborera n'ifumbire mva ruganda)	12
Igice cya 9: Uburyo bwo gutera	14
Igice cya 10: Kubagara no gusukiraitaka	15
Igice cya 11: Kuvanamo ikibi	16
Kurwanya indwara n'ibyonnyi	17
Igice cya 12: Kurwanya indwaray'imvura	17
Igice cya 13: Kurwanya Kirabiranya	19
Igice cya 14: Kurwanya Kabore	20
Igice cya 15: Kurwanya indwara y'Imfunyarazi	21
Igice cya 16: Kurwanya imungu y'ibirayi	22
Igice cya 17: Kurwanya amavunjay'ibirayi	23
Gusarura no kubungabunga umusaruro	24
Igice cya 18: Kunyomora	24
Igice cya 19: Gusarura, Gutoranya no gutondeka ibirayi	25
Igice cya 20: Guhunika imbuta y'ibirayi	26
Imigereka	28
Umugereka wa 1: Imiterere y'amoko y'ibirayi aboneka mu Rwanda	28
Umugereka wa 2: Urugero rwo gusimburanya ibihingwa	30
Umugereka wa 3: Ibibazo n'ubutumwa bwo kuzirikana kuri buri gice	31
Umugereka wa 4: Urugero rw'isuzumabumenyi rya mbere na nyuma y'amahugurwa	36

Imiterere y' iyi nyigisho

Ibigize amahugurwa

Iyi mfasha nyigisho ku "Gutubura neza imbuto y' ibirayi mu Rwanda" igizwe n'amasomo ane (4) n'ibice 20, nkuko bigaragara hano hasi:

Isomo rya 1. Iby' ibanze ku butubuzi bw'imbuto y'ibirayi

Igice cya 1: Uruhererekane nyongeragaciro rw'imbuto y'ibirayi

Igice cya 2: Ibiranga ikirayi cy'imbuto

Igice cya 3: Ubwiza bw'imbuto no kuzemeza

Igice cya 4: Gusimbuza imbuto

Igice cya 5: Kubika inyandiko

Isomo rya 2. Ubutaka, igihingwa n'Imikoreshereze myiza y'amazi

Igice cya 6: Guhitamo ubutaka no gusimburanya ibihingwa

Igice cya 7: Gutegura umurima

Igice cya 8: Gufumbira (ifumbire y'amatungo, imborera n'imvaruganda

Igice cya 9: Uburyo bwo gutera

Igice cya 10: Kubagara no gusukira itaka

Igice cya 11: Kuvana ikibi

Isomo rya 3. Kurwanya indwara n'ibyonnyi

Igice cya 12: Kurwanya indwara y'imvura

Igice cya 13: Kurwanya Kirabiranya

Igice cya 14: Kurwanya Kabore

Igice cya 15: Kurwanya Imfunyarazi

Igice cya 16: Kurwanya imungu y'ibirayi

Igice cya 17: Kurwanya amavunja y'ibirayi

Isomo rya 4. Imirimo yo gusarura no guhunika

Igice cya 18: Kunyomora

Igice cya 18: Gusarura, Gutoranya no, Gutondeka ibirayi

Igice cya 20: Guhunika imbuto y'ibirayi

Urukurikirane rw'amasomo n'ibice biri muri iyi mfashanyigisho rukurikije imiterere nyakuri y'imikurire y'igihingwa cy'ibirayi. Niyo mpamvu, ari ngombwa gukurikiranya neza ibi bice mu gihe cyo gutanga amahugurwa. Iyi mfashanyigisho ishobora gukoreshwa hatangwa amahugurwa kubazahugura abandi (abahugura abahinzi b'ibirayi) cyangwa se igakoreshwa uhugura abahinzi bitanyuze kubazabahugura. Kuri buri gice, utanga amahugurwa ku bazahugura cyangwa uwahuguwe agomba gute ganyanya nibura iminota 15 yigisha, hanyuma agateganya indi minota 10 ku bibazo n'ibisubizo. Muri rusange, izi nyigisho zimara nibura amasaha 8 kugirango zirangire gutangwa, bihwaye n'iminsi 2 y'amahugurwa kubazahugura abandi cyangwa se ibyiciro 4 by'amasaha 2 uhugura abahinzi. Mu rwego rwo kureba akamaro amahugurwa yagize kuri buri cyiciro, abahugura barakangurirwa gutanga isuzuma bumenyi ryanditse ku bahugurwa yaba mbere cyangwa nyuma y'amahugurwa hifashishijwe ibibazo bimwe. Urugero rw'ibibazo byabazwa ruri ku mugereka. Ni ngombwa ko abazahugura abandi, nibura baba bafite amanota 12/20 mu isuzumwa ryatazwe.

Imfashanyigisho z'amahugurwa

Iyi nyigisho igomba kugira ibyo yifashisha mu mahugurwa kugirango ibashe gutangwa no kumvikana neza. Ibyifashishwa mu mahugurwa bigizwe n'amasomo anyuranye yifashishwa n'abantu batandukanye ku butubuzi bw'imbuta y'ibirayi. Nibura, hari ubwoko 4 bw'imfashanyigisho yifashishwa mu guhugura abazahugura abandi ndetse no gukomeza kugera ku mahugurwa y'abahinzi b'ibirayi. Izo mfashanyigisho ni izi zikurikira:

- 1) Igitabo cy'amahugurwa
- 2) Imfashanyigisho y'amashusho
- 3) Imfashanyigisho y'umuhinzi n'
- 4) Imfashanyigisho nyobora

Igitabo cy'amahugurwa

Igitabo cy'amahugurwa, ni gitabo gikuru cy'amahugurwa. Kigizwe n'ibice bitatu by'ingenzi: (i) Incamacye y'amasomo, (ii) Amasomo 4 n'ibice 20 nabyo bigaragara mu mfashanyigisho y'umuhinzi, hamwe na (iii) Imigereka. Incamacye igaragaza imiterere y'amahugurwa ndetse n'imfashanyigisho zizifashishwa. Igice cya kabiri cy'igitabo cy'amahugurwa kigaragaza amasomo agize amahugurwa ndetse nuko uhugura agomba kwitwara. Mu gice cya nyuma, iki gitabo kigaragaza ibibazo byatanze ndetse n'ubutumwa uhugurwa asigarana kuri buri gice nkuko bigaragara mu mfashanyigisho y'amashusho ndetse no mu isuzumabumenyi rigaragaza ubumenyi abahugurwa basigaranye.

Imfashanyigisho y'amashusho

Iyi ni imfashanyigisho ngiro ifasha uhugura gutanga amahugurwa. Ipaji y'imbere iba iriho ifoto igaragaza igice kigiye guhugurwaho. Ni ifoto abahugurwa baba bareba. Ipaji y'inyuma iba igenewe uhugura kandi iriho ibintu bine by'ingenzi birebana na buri gice uko ari 20: (i) agace gatoya kariho ifoto isa niri kuri paji y'imbere ; (ii) incamacye y'inyigisho yerekana iby'ingenzi biganirwaho; (iii) Ibibazo 3 ngenderwaho; (iv) n'ubutumwa bw'ingenzi abahugurwa basigarana. Ifoto ntoya iri inyuma ifasha uhugura kuzirikana igice arimo kwigisha. Mu gihe hasobanurwa ibiri ku ifoto, hifashishwa ifoto iri kuri paji y'imbere. Mu gihe arimo kuvuga ku ncamacye y'isomo, uhugura abaza abahugurwa kwitegereza neza ifoto hanyuma bakamubwira icyo barimo kuyumvaho. Kuri buri shusho, nibura ibibazo 3 bigomba kubazwa kugirango harebwe niba abahugurwa bumvishe cyangwa batumvise neza isomo. Uhugura asoza isomo atanga ubutumwa bwo kuzirikana.

Imfashanyigisho y'umuhinzi

Aka ni agatabo gatoya gashobora gukwira mu mufuka, niko umuhinzi wahuguwe akoresha. Ni ngombwa gutangwa iyi nfashanyigisho umaze gutanga amahugurwa. Niba gutanga iyi mfashanyigisho bibaye mbere y amahugurwa, bishobora guha abitabiriye urwitwazo rwo gusiba amahugurwa cyangwa gutakaza ibitekerezo mu gihe cy'amahugurwa. Ni muri urwo rwego, mfashanyigisho ishobora gufatwa nka kimwe mu byifashishwa mu gushimira abahinzi nyuma yo gusoba amahugurwa.

Imfashanyigisho nyobora

Iyi ni mfashanyigisho y'inyongera ifasha mu gutanga amahugurwa. Nyamara, ntaho bivuze ko yakwifashishwa yonyine. Ifasha abahugura gutunganya no koroshya neza amahugurwa mu murima, gutanga inyunganizi ku nyigisho yatanze mu magambo iri mu gitabo cy'amahugurwa. Igizwe n'ibintu bitatu byerekana: (i) kwita ku gihingwa, (ii) guhitamo icyiza na (iii) uburyo bwo gukoresha akarima gato. Kuri buri gice, iyi mfashanyigisho itanga ibisubizo ku bibazo bikurikira: Niki, Kubera iki, Ryari, Mu gihe kingana iki, Hamwe niki kandi gute. Ni gute uhuza inyandiko n'amashusho mu rwego rwo gusobanura intambwe zitandukanye zisabwa muri buri cyiciro cy'amahugurwa. Mu gihe utegura amahugurwa wifashishije iyi mfashanyigisho, uhugura agomba gusuzuma intambwe enye zikurikira: (i) Intangiriro kuri (cyangwa ibisobanuro bigufi byo kunonosora kuri) ingingo; (ii) imyitozo igaragara muri iyi mfashanyigisho; (iii) umwanya w'ibibazo n'ibisubizo mu bitabiriye amahugurwa; hanyuma (iv) ibikurikiraho mu gutegura amahugurwa ataha.

Ibikubiye muri iyi mfashanyigisho

Isomo 1 Iby'ibanze ku butubuzi bw'imbutu y'ibirayi

Igice cya 1. Uruhererekane nyongeragaciro rw'imbutu y'ibirayi



Gukoresha imbutu nziza y'ibirayi ni kimwe mu bintu by'ingenzi bigena umusaruro mu buhinzi bw'ibirayi. Ikigereranyo cy'umusaruro wagezweho n'abahinzi bato b'ibirayi mu Rwanda uracyari hasi kugeza kuri toni 10/ha kandi ibi biterwa ku ruhande rumwe no guhinga imbutu imwe mu bihe bitandukanye. Kuboneka, kugerwaho no gukwirakwiza imbutu nziza y'ibirayi ni ikibazo gikomeye mu turere duhingwamo ibirayi mu Rwanda.

Ubutubuzi bw'imbutu y'ibirayi mu Rwanda bugizwe n'ibyiciro bitandukanye. icyiciro cya mbere gitangirana no gutubura ingemwe z'ibirayi muri laboratwari. icyiciro cya kabiri kigizwe no gutubura imbutu remezo (minituberikire) cyangwa gutubura ingemwe bikorerwe mu mazu yabigenewe (sere). icyiciro cya gatatu n'icya kane bigizwe n'imbutu fatizo n'imbutu shingiro, ituburirwa mu murima. Imbutu shingiro ikomeza gutuburwa, igatanga imbutu icuruzwa ifite icyemezo cy' ubwiza. Aya masomo yateguwe kugirango atange amahugurwa mu gutubura imbutu kuva ku mbuto remezo ukagera ku mbuto yemewe icuruzwa.

Gutubura imbuto n'igikorwa gisaba ubumenyi kandi kigizwe n'imirimo myinshi. Umutubuzi w'imbuto y'ibirayi mu Rwanda, ni umuhinzi wabigize umwuga kandi ugomba kuba yanditswe byemewe n'ikigo cy'igihugu gishinzwe ubugenzuzi, amarushanwa no kurengera umuguzi (RICA). Kugirango ufatwe nk'umutubuzi w'imbuto y'ibirayi, umutubuzi agomba kuzuza ibi bikurikira:

- 1) Kugira ubutaka bwa hegitari 5 zihingwaho.
- 2) Kugira ubuhunikiro bufite ahantu ho gutoranyiriza imbuto.
- 3) Kugira umugoronome niba ari ikigo cyangwa koperative; niba ari umuhinzi ku giti cye, agomba kuba afite amahugurwa ahagije yatanze n'inzego zemewe zibifitiye ubushobozi.

Imbuto nziza igomba gutandukanywa neza n'ibirayi bisanzwe binyuze mu birango, kuyiranga, ndetse no gushyiraho uruherekane ngenagaciro rw'imbuto. Gutubura imbuto no guhinga ibirayi byo kurya n'ibikorwa bibiri bitandukanye rwose, ariko ibikorwa bifatanye isano mu buryo bwo guhinga bigomba gukurikizwa. Hakurikijwe amabwiriza agenga ubuhinzi n'ubutubuzi bw'imbuto y'ibirayi birashoboka gusurura toni 30 kuri hegitari cyangwa hejuru yazo mu Rwanda.

Niyo mpamvu hakenewe gutuma imbuto zegera abahinzi binyuze mu butubuzi bwegereye abahinzi. Ubutubuzi bwegereye abahinzi buzatuma ikoresheya ry'imbuto nziza riyongerera kuko abahinzi bashobora kubona agaciro k'imbuto nziza bivuye mu mirima y'abaturanyi babo b'abatubuzi kandi bagashobora kugura imbuto nkeya biboroheye. icyizere hagati y'abatubura imbuto n'abaguzi bayo n'ingirakamaro cyane mu guteza imbere ubucuruzi bw'imbuto.

Ubwoko bw'imbuto zikunda guhingwa mu Rwanda ni Sangema, Cruza, Mabondo, Victoria, Kirundo, Mizero, Kigega, Ngunda, Nderera, Gikungu, Kinigi, Nkunganire, Ndeze, Twihaze, Kazeneza, Izihirwe, Twigire, Kerekezo, Jyambere, Seka, Gisubizo, and Ndamira. Incamacye y'ibiranga imbuto zose zihingwa mu Rwanda iragaragara ku mugereka wa 1.

Igice cya 2. Ibiranga ikirayi cy'imbuto



Ingano nziza y'ibirayi by'imbuto ni mm 28-55 y'umurambararo. Ibirayi by'imbuto ni ibinyabuzima bifite urugendo rw'ubuzima rushobora kugabanywamo ibice bine bikurikirana:

- 1) **Gusinzira (ako kanya nyuma yo gusarura):** Mu gihe cyo gusinzira, ibirayi by'imbuto bihumeka nk'ibinyabuzima bizima, byinjiza umwuka wa ogizijeni, bigasohora uwa karuboni ndetse n'ubushyuhe. Niyo mpamvu, ari ngombwa guhunika imbuto y'ibirayi mu kigega gifite ubuhumecyero kuko umwuka wa karuboni n'ubushyuhe bitera ibirayi kumera vuba. Menya ko ibi bishobora kuba byiza niba igihe kiri hagati y'ibihe by'ihinga ari kigufi kuruta igihe gisanzwe cyo gusinzira ku bwoko butandukanye.
- 2) **Umumero umwe utangira gukura mbere:** Muri iki cyiciro, umumero umwe utangira gukura uvuye mu kirayi cy'imbuto. Uyu mumero wa mbere uba ufite ubwiganze busobanuye ko ariwo uzakora uruti rw'ingenzi ku kirayi mu gihe cyo gukura kwacyo, niba udakuweho. Mu moko menshi, ni ngombwa guhungura uwo mumero wa mbere kugira ngo havuke indi mimero myinshi yo kuruhande. Iki gikorwa kandi ushobora kugikora ushaka gutinza imera ry'imbuto mu gihe igihe cyo gutera kitaratangira.
- 3) **Imimero myinshi:** Muri iki cyiciro, imimero yo ku ruhande itangira gukura. N'igihe cyiza cyo gutera ibirayi by'imbuto mu gihe iyo mimero ikomeye, ifite ibara ryijimye kandi ari migufi (cm 1-2 z'uburebure), kandi mu gihe hariho imimero iri hagati ya 3 kugeza kuri 6 kuri buri kirayi.
- 4) **Gusaza:** Iki cyiciro kirangwa n'imimero yerurutse, miremire kandi inyunyutse. Ibirayi by'imbuto muricyi cyiciro biba bishaje cyane kuburyo bitaterwa. Niba ibi birayi by'imbuto bitewe muricyoi cyiciro, uruti ntiruzazamuka neza, kandi ibirayi bizazaho bizaba bito imbuto ishaje irafobagana kuko iba yarataye amasukari n'amazi aba agize ikirayi.

Imimero migufi (cm 1-2 z'uburebure), ikomeye, ifite ibara (ibara ry'ubwoko byayo) iba yemezako nimara guterwa, izahita ikura neza, ikihuta kandi ibihingwa bikazaba bisa bifite ubwiza bumeze kimwe.

Ibyumweru 4-6 mbere yo gutera, imimero ya mbere igomba gukurwaho kugirango bitumen havuka imimero myinshi yo kuruhande. Imimero igomba gukurwa ku birayi by'imbuto inshuro imwe gusa. Kuvutsa imimero mishya ku nshuro ya kabiri bitwara ingufu, amazi n'itungagihingwa ziva mu kirayi kugirango cyongere kumera, bityo rero bigabanya ingufu z'ikirayi cy'imbuto bityo umusaruro ukagabanuka.

Ni ngombwa kugira ibirayi by'imbuto bimeze neza (icyiciro cya 3) mu gihe gikwiye iyo igihe cy'ihinga gitangiye. Niyo mpamvu, ari ngombwa gusobanukirwa ibihe byo gusinzira by'ubwoko butandukanye kugirango ubashe gutegure igihe cyo gutera no gusarura imbuto zizaboneke mu gihe cyiza cyo gutera. Urugero, Cruza na Kirundo bigira igihe gito cyo gusinzira kitarenze ibyumweru 6, mu gihe Sangema, Kinigi na Gikungu bifite igihe kirekire cyo gusinzira kirenze ibyumweru 12.

Ibi bivuze ko gutera, gusarura no guhunika ibirayi by'imbuto z'ubu bwoko butandukanye bigomba kuba mu buryo butandukanye.

Igice cya 3. Ubwiza bw'imbutu no kuzemeza



Ubwiza nicyo kintu cyingenze gitandukanya ibirayi by'imbutu n'ibirayi byo kurya, kandi niyo mpamvu ituma ibirayi by'imbutu bihenda kuruta ibirayi byo kurya. Ubucuruzi buteye imbere bw'umutubuzi w'imbutu buterwa n'ubushobozi bwo gukomeza gutubura no gutanga imbuto nziza. Abatubuzi b'imbutu bagomba kubaka izina ryabyo binyuze mu gukomeza gutubura imbuto nziza kugirango bareme ikizere mubabakiriya babo. Gukurikirana n'ibirango by'imbutu ni ibintu byingenze byubaka izina ry'umutubuzi mu gutanga imbuto nziza.

Imbuto y'ibirayi iba ari nziza cyane iyo idafite indwara n'udukoko, imeze kimwe, kandi ifite ubunini bugereranije, hagati ya mm 28-55 mm.

Ibirayi ni kimwe mu bihingwa byibasirwa cyane n'indwara n'ibyonnyi. Indwara z'ibirayi zandura byoroshye bitewe no guhura kw'ibintu, binyuze:

- 1) Guhura hagati y'igihingwa kizima n'ikirwaye mu murima, mu gihe amababi akoranyeho kubera umuyaga;
- 2) Guhura kw'ikirayi kizima n'ikirwaye mu gihe cyo guhunika.
- 3) Guhura kw'ibirayi bizima ndetse n'ibikoresho byakoreshejwe ubushize mu gusarura, gupakira no kubika ibirayi byanduye (ibikoresho byubuhinzi, imifuka, amakureti, n'ibindi).
- 4) Guhura k'umukozi wambukiranya umurima mwiza w'ibirayi nyuma yo gusura umurima w'ibirayi urwaye, cyangwa yakoze ku gihingwa kirwaye mu murima.

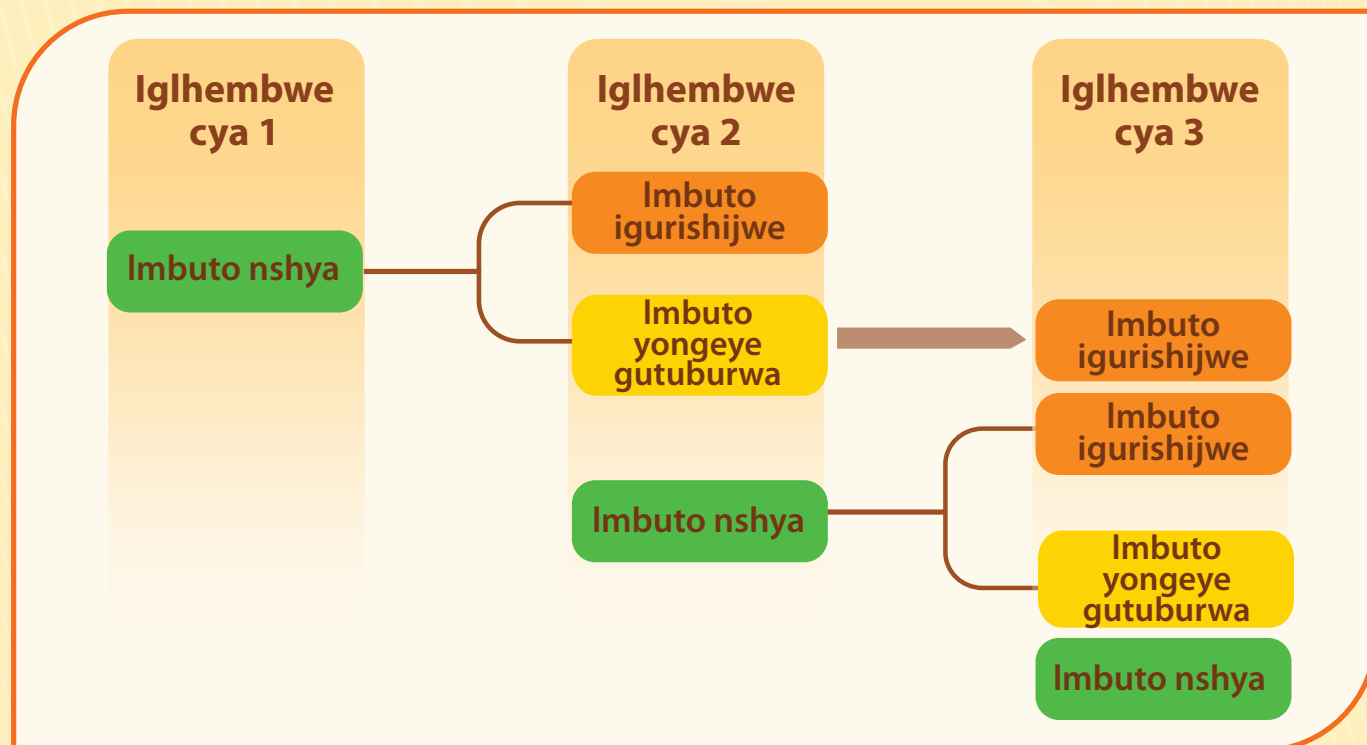
Indwara z'ibirayi zishobora kandi gukwirakwira binyuze mu mazi atemba aha mu murima ujya mu wundi, umuyaga, udukoko, cyangwa ibikoresho by'ubuhinzi byanduye. Abatubuzi b'imbutu bagomba gukurikiza uburyo bwiza bwo gutubura imbuto nkuko bukubiye muri iyi mfashanyigisho kugirango batange imbuto itarangwaho indwara n'ibyonnyi.

Kwemeza imbuto ni uburyo bwo kwemeza ubwiza aho ibikorwa byo gutubura no kwita ku musaruro bigenzurwa n'inzego za leta zibifitiye uburenganzira. Kwemezwa kw'imbutu mu Rwanda ni inshingano za RICA. Abatubuzi b'imbutu bifuza ko imbuto zabo zemerwa bagomba kubimenyesha RICA mbere yuko igihembwe cyo gutubura imbuto gitangira.

Abagenzuzi b'imbuto basura inshuro 4 mu gihe cy'ihinga, (1) mu minsi 15 nyuma yo gutera, (2) mu gihe cyo kuzana indabyo, (3) mbere yo gusarura, na (4) mu gihe cyo guhunka. Kuri buri sura, umugenzuzi w'imbuto asuzuma ibipimo by'ubuzima bw'gihingwa n'imbuto ko biboneye (ubuziranenge bw'imbuto) agendeye ku byemezo byashizweho.

Nkuko abagenzuzi b'imbuto bakunze gusura abatubuzi b'imbuto benshi ku muni umwe, hagomba kwitabwaho guhindura cyangwa gusukura inkweto inkweto n'ipantaro hagati yo gusura umwe n'uwundi, kugirango birinde kwanduza ibice bituburirwamo imbuto.

Igice cya 4: Gusimbuza imbuto



Gusaza kw'imbuto n'urukomatanye rw'indwara n'ibyonnyi hamwe n'ihindagurika ry'imiterere y'imbuto y'ibirayi biza bikurikiranye mu bihe by'ubutubuzi bw'imbuto mu murima, ibi bigatuma ubwiza bw'imbuto bugabanuka. Gusaza kw'imbuto bifitanye isano no kugabanuka k'ubwiza bw'imbuto n'umusaruro. Gusaza kw'imbuto guterwa cyane cyane na virusi yibirayi ikwirakwizwa n'uduhunduguru, isazi zera, cyangwa guhura n'ibintu byanduye. Kubera iyo mpamvu, abatubuzi b'imbuto bagomba guhindura ububiko bw'imbuto zabo (imbuto shingiro) buri gihe.

Nk'itegeko, abatubuzi b'imbuto zemewe zifite icyemezo cy'ubwiza ntibagomba kongera kuzitera inshuro irenze imwe, bakoresheje imbuto ituruka ku mbuto shingiro y'ubushize. Kubw'ibyo, abatubuzi b'imbuto zemewe bagomba gutubura imbuto shingiro inshuro zitarenze ebyiri. Ibirayi by'imbuto bitubuwe bivuye ku mburo shingiro zishobora kongera gutuburwa ku nshuro ya kabiri. Umutubuzi w'imbuto ashobora kandi gufata icyemezo cyo kugurisha igice kimwe cy'imbuto ku bahinzi b'ibirayi byo kurya. Nyuma yo gutubura imbuto ibihe bibiri by'ihinga ivuye ku mbuto shingiro umutubuzi yarafiye, imbuto yose igomba kugurishwa nk'imbuto ku bahinzi b'ibirayi byo kurya kandi ntibigomba kongera gutuburwa nk'imbuto. Abatubuzi b'imbuto bagirwa inama yo kugura imbuto shingiro nshya buri gihembwe cy'ihinga. Imbuto shingiro nshya hamwe n'imbuto yavuye kuri shingiro y'ubushize bigomba guterwa mu mirima itandukanye.

Imbuto shingiro ziboneka ku bigo n'abatubuzi bemewe. Muri byo harimo Ikigo cy'iterambere ry'ubuhinzi n'ubworozi (RAB), Horyzon Sopyrwa, Kaminuza y'ubumenyi ngiro (INES) hamwe n'abatubuzi bato bikorera ku giti cyabo batubura imbuto remezo (minituberikire), imbuto fatizo n'imbuto shingiro. Aba batubura imbuto shingiro, bahereye ku mbuto fatizo nazo ziba zabonetse zivuye ku mbuto remezo cg ingemwe z'ibirayi. Imbuto remezo n'ingemwe z'ibirayi biboneka biturutse ku ngemwe zituburirwa muri laboratwari za RAB na INES.

Igice cy'5: Kubika inyandiko



Urugero rw'ibika nyandiko n'isesengura ry'urwunguko kuri hegitari imwe

Igikorwa	Ingano	Igiciro kuri kimwe (Frw)	Igiciro cyose (Frw)
A. Inyongeramusaruro n'ibikoresho			
Ubukode bw'ubutaka	1 ha ha 1	300,000	300,000
Imbuta ibanza	3,000 kg	600	1,800,000
Ifumbire mvaruganda	300 kg	600	180,000
Ifumbire mborera	25,000 kg	20	500,000
Imiti y'indwara n'ibyonnyi	6 anacupa	75000	450,000
Imifuka yo gupakiramo	300	500	150,000
IGITERANYO			3,380,000
B. Abakozi			
Gutunganya ubutaka	50 imibyizi	1500	75,000
Gutera	40 imibyizi	1500	60,000
Kubagara no gusukira itaka 1& 2	50 imibyizi	1500	75,000
Kunyomora	10 imibyizi	1500	15,000
Gusarura no kwikorera	70 imibyizi	1500	105,000
Guhunika	50 imibyizi	1500	75,000
IGITERANYO			405,000
Icyiguzi cyose cy'ibyasohowe			3,785,000
Ibitateganijwe (30%)			1,135,500
Igiteranyo cy'ibyasohotse byose			4,920,500
Amafaranga yose yinjijye huri Ha	300 Imifuka	30000	9,000,000
Urwunguko			4,079,500
Inyungu kubyasohowe			83

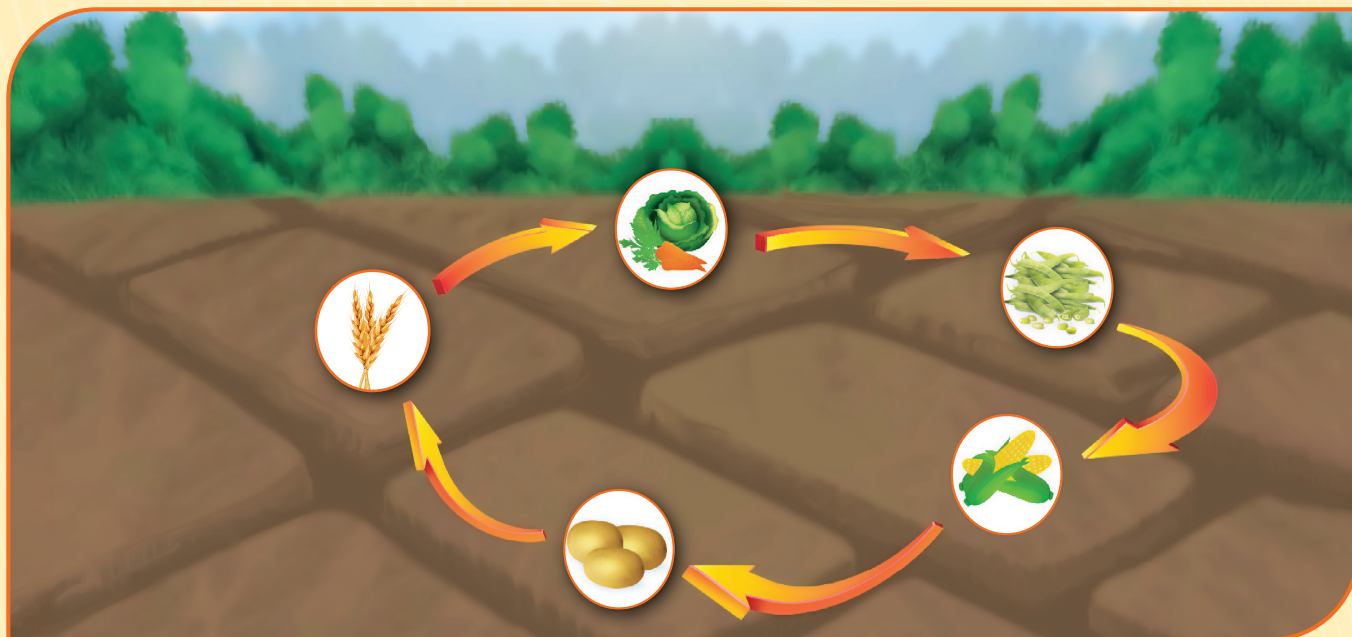
Tugeranije ko nibura toni 15 zasaruwe zikanagurishwa

Ibintu byose byinjijye cyangwa byasohotse bigomba kwandikwa neza mu bitabo. Kubika inyandiko ni ngombwa ku batubuzi b'imbuta kugirango ubashe kumenya ibyasohotse ndetse no gusesengura inyungu iva mu butubuzi bw'imbuta. Ubwoko bw'ibisohoka bugenda butandukana cyane ariko muri rusange bigizwe n'ibintu bikurikira: imbuto z'intangiriro, ifumbire mvaruganda n'ifumbire mborera, imifuka yo gupakira umusaruro, imiti irwanya indwara, imiti yica udukoko, n'abakozi uherye mu gutunganya ubutaka kugeza mu gusarura, gutwara no guhunika.

Isomo 2

Ubutaka no kwita ku gihingwa

Igice cya 6: Guhitamo ubutaka no gusimburanya ibihingwa



Ikintu cya mbere ugomba gusuzuma muguhitamo ubutaka bwo gutuburiramo imbuto ni aho umurima uzaba uherereye. Imirima iri ahantu hacye bugufi ishobora guhura n'ingorane bitewe n'amazi ava mu mirima y'ahirengeye kandi ashobora gutwara indwara. Nanone, imirima iri ahantu hirengeye usanga idakunze kwibasirwa n'udukoko dukwirakwiza virusi y'ibirayi, nk'uduhunduguru, isazi zumweru. Imbuto nshya y'intangiriro igomba rero guhingwa mu mirema iri ahirengeye, mu gihe imbuto zizava kuyabanje zishobora guhingwa mu mirima iri ahantu hacye bugufi. Imbuto nshya y'intangiriro ntigomba guhingwa mu mirima imaze guhingwamo imbuto zavuye kuzahinzwe mbere.

Teganya neza intera ihagije (> 20m) hagati y'umurima w'imbuto n'umurima w'ibirayi biribwa. Niba bidashoboka ko hagati y'iyi mirima uhareka gusa, hagashyirwa ibihingwa bikora uruzitiro nk'ibyatsi by'amatungo, ibigori cyangwa ibindi bihingwa bitari mu muryango umwe n'ibirayi. Ibihingwa biba mu muryango umwe n'ibirayi urugero nk'intoryi, urusenda, inyanya, itabi ntibigomba guterwa hafi y'umurima kuko bishobora gukurura indwara zimwe nk'izifata ibirayi. Imirima yo gutuburiramo imbuto igomba kuba iri ahantu hagerwa byoroshye kugirango ifashe mu gukurikirana ibihingwa kandi byaba byiza ikaba hafi y'amazi kugirango ibe yakongerwamo amazi mu gihe cyimvura nke.

Ubutaka bugomba kuba burebure, bwumutse neza, kandi buseseka kugirango ibirayi bikure neza. Ahantu hagomba kuba hatarangwamo udukoko two mu butaka, nk'amavunja y'ibirayi (nematode), Kirabiranya na Kabore. Ni ngombwa gupima ubutaka kugirango harebwe intungagihingwa no kumenya nematode n'indwara mbere yo gutangira igihembwe cy'ihinga. Ahantu haba amazi yireka hagomba kwirindwa

Hitamo ahantu ibirayi cyangwa ibindi bihingwa biba mu muryango umwe bitigeze bihingwa byibuze mu bihe 4-5 bishize. Ndetse ibi bihingwa bitarahinzwe hafi y'ahatuburiwe. Abatubuzi b'imbuto bagomba kuba bafite ubutaka buhagije butuma haba gusimburanya ibihingwa bitaba mu muryango umwe n'ibirayi.

Ibi bizatuma indwara n'udukoko twangiza ibirayi tuzarwanywa mbere yuko hongera guterwamo imbuto y'ibirayi nanone.

Uburyo bwiza bwo guhinduranya ibihingwa ni ukugabanya isambu aho imbuto y'ibirayi izahingwa, mo ibipande bitanu kugirango bizasimburanemo hamwe n' ibindi bihingwa nk'ibigori/ingano, ibishyimbo, karoti, amashu, n'ibinyamisogwe. Mu murima wari ufite ubwandu bwa nematode, ibigori ntibigomba kubanziriza ibirayi kuko ibigori nabyo birwara nematode. Mu murima ufite uburumbuke buke bw'ubutaka, ibigori nabyo bigomba kwirindwa kubanziriza ibirayi kuko ibigori nabyo bikenera imyunyu myinshi. Muri iyo mirima, ibirayi bigomba gukurikira ibinyamisogwe (ibishyimbo, soya, amashaza) cyangwa ingano. Urugero rwo gusimburanya ibihingwa rushobora gushyirwa mubikorwa warusanga ku mugereka wa 2.

Mugihe cyo gusimburanya ibihingwa, ni ngombwa ko kimeza yose y'ibirayi (nukuvuga, ibirayi byameze bivuye kubyagiye bisigara mu gihe cy' ibihe byashize) irandurwa, kuko bishobora kubika udukoko n'indwara. Imirima ihingwaho ibirayi by'imbuto igomba kugenzurwa buri gihe mbere na nyuma yo guhingamo imbuto y'ibirayi kandi ibihingwa byose byimejemo bigomba kurandurwa bikavanwa kure y' umurima. Ntabwo ari byiza kuraza umurima wasaruyemo imbuto kuko mu murima waraye biragoye kubona ibirayi bya kimeza byimejeje.

Igice cya 7: Gutegura umurima



Guhinga bishobora gukorwa ukoresheje isuka, ibimasa, cyangwa imashini zihinga. Hinga ubutaka kugeza kuri cm 30 byibura. Tegura umurima kugeza ubwo ubutaka bworoha kandi butarangwamo ibinonko. Gutegura neza imitabo iterwaho imbuto bizafasha kunoza imiterere y'ubutaka, kurwanya ibyatsi n'indwara. Wibuke ko ubutaka bwateguwe kugeza ubujyakuzimu butarenze cm 30 buzatuma umusaruro uba muke.

Gutegura ubutaka nibura bitangira ku byumweru 2 mbere yo gutera kandi hagakorwa:

- 1) Gutema, gutongora no kuvanamo amabuye.
- 2) Guhinga (ukoresheje isuka cg imashini).
- 3) Gusanza.
- 4) Gukora amabimba cg imitabo, (mu gihe haba isuri cg hatarakamuwe neza) ndetse no gusatura imirongo iromberereje nayo iterwaho kuburyo bwa kijyambere arinayo itanga umusaruro mwinshi.

Aho guhinga bikorwa mu buryo bw' imashini, ibuka guhindura uko umwaka utashye ubujyakuzimu bwo guhinga kugirango wirinde icyitwa "guhinga-isafuriya", bituma habaho igice ubutaka butamenwe bityo bikagorana gutambuka k'amazi n'umwuka.

Ku bahinzi bateganya gutera ku mirima mito, gukoresha utumashini duto birashoboka, mu gihe imashini nini (taragiteri) zikoreshwa n'abahinzi bafite imirima minini hejuru ya ha 5-10. Mu bukungu, urunguka iyo ukoresheje taragiteri ya 80 Hp ku buso nibura bwa ha 50. Kubw' ibyo, abahinzi barashishikarizwa gushinga amakoperative cyangwa amashyirahamwe kugirango babone taragiteri no kugabanya ibiciro.

Gukoresha imashini zihinga bishobora gukomeza ubutaka, ibi bikaba Atari byiza cyane ku buhinzi bw'ibirayi. Kubw' ibyo, niba imashini zihinga izakoreshwa, ni byiza kugabanya umubare w'inshuro inyura hagati mu mirongo.

Ibikoresho bikoreshwa mu gutegura ubutaka (amasuka, udufuni, imihoro n'ibindi twifashisha muguhinga mu rwanda) bigomba gusukurwa (ukoresheje urugero nka Jike) nyuma y'akazi, na mbere yo kuva mu murima ujya muwundi kugirango wirinde indwara n'ibyonnyi bwakwirakwira hagati y'imurima y'imbuto y'ibirayi.

Igice cya 8: Gufumbira (ifumbire y'amatungo, imborera n'ifumbire mva ruganda)



Kimwe n'ibindi bihingwa byose, ibirayi bisaba imyunyu ihagije iva mu bimera (imborera cg iy'amatungo) n'ifumbire mvaruganda kugirango bikure neza. Azote (N), Fosufori (P) na Potasiyumu (K) n'itungamubiri zingenzi ku gihingwa cy'ibirayi. Igihingwa cy'ibirayi gitanga toni 10 kuri hegitare, cyiba cyakuye kg 40 za Azote, kg 10 za fosifore na kg 50 za potasiyumu mu butaka, kandi iyo myumyu igomba gusimburwa kugira ngo uburumbuke bw'ubutaka butagabanuka. Azote na Fosifore n'ibyingenzi byose mu gihe cyikura ry'ibihingwa, mu gihe Potasiyumu ikenerwa cyane mu gihe cyi'byimba ry'ibirayi. Ukurikije ubwoko bw'ubutaka, birashobora kuba byiza gukoresha imyunyu yo mu rwego rwa kabiri nka Ca, Mg, S na Zn.

Ifumbire nkeya ya azote na potasiyumu niyo igomba gukoreshwa ugereranije no mu guhinga ibirayi byo kurya, kuki izo fumbire zituma ibirayi biba binini. Nyamara ingano ntoya y'ibirayi niyo iba igamijwe mu gutubura imbuto y'ibirayi. Kandi, iyo ukoresheje azote nyinshi, habaho gukura gukabije kw'imigozi y'ibirayi. Ikiyongereyeho, azote nyinshi ituma ibimenyetso bya virusi bitagaragara mu mababi. Fosifore niwo munyu w'ingenzi cyane mu butubuzi bw'imbuto kuko utuma ibirayi bibyara bikagira umubare mwinshi.

Akamaro k'ifumbire kagaragara mu gihe ubwinshi n'ubwoko bw'ifumbire igomba gukoreshwa bigenwe n'ubwoko bw'ubutaka ndetse n'amateka y'umurima. Ibi byitwa "Kugena ifumbire ikwiye hagendewe ku karere runaka". Uburyo bwo gutanga ifumbire yihariye ku karere hashingiye ku isesengura ry'ubutaka cyangwa ikarita y'ubutaka bugenda burushaho kuboneka, kandi abahinzi bagomba gushaka inama ikwiye, iboneka kandi ya vuba, mbere yuko igihembwe cy'ihinga gitangira.

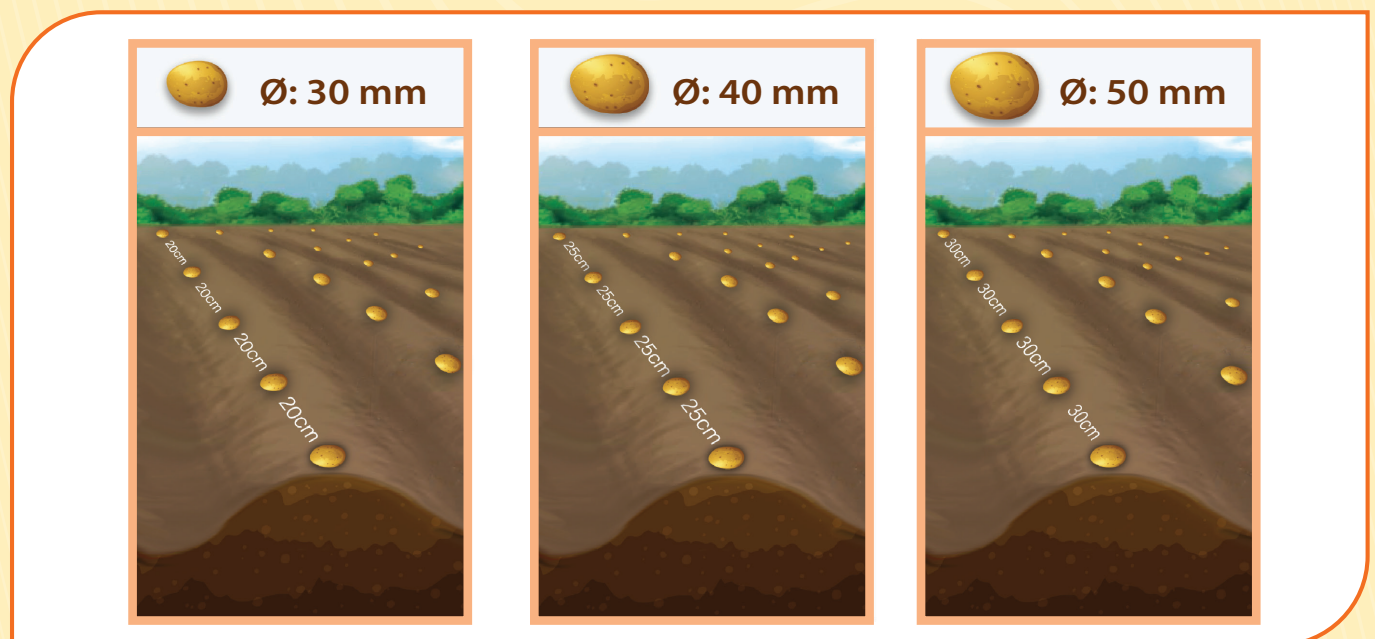
Mu gihe inama ku ifumbire ikenewe ku karere runaka itaraboneka, ni byiza gukoresha kg 3 ya NPK 17-17-17 kuri ari 1 (metero kare 100) igabanijwemo ibice 2 (kg 1.5 kg mu gutera na kg 1.5 mu gihe cyo kubagara). Iyi ingana ni ibiro 300 kg bya NPK (imifuka 6 ya kg 50) kuri hegitari 1. Ni byiza gushyiramo igice cy' ifumbire mu gutera n'ikindi mu gihe cy'ibagara rya mbere unuhira ubutaka, icyumweru 1-2 nyuma yuko ibirayi bimeze mu butaka.

Ifumbire mvaruganda ni byiza cyane kuyikoresha hamwe ni'fumbire mborera. Ifumbire mborera iboze neza yuzuye mu biganza 2 ishobora gukoreshwa kuri buri kirayi. Ibi bihwaye na 200-300 kg by'ifumbire kuri ari 1. Ibi ni ingirakamaro cyane kubutaka budafite ifumbire. Ibi si ngombwa ku butaka bukize nk'ubutaka bw'amashyamba. Ifumbire mborera igomba gukoreshwa mugihe cyo gutegura umurima cyangwa mu gutera. Ifumbire yo mu gikoni irimo ibirayi, inyanya, intoryi, urusenda, cyangwa ibindi bihingwa biri mu bwoko bumwe n'ibirayi ntibigomba gukoreshwa kuko bishobora gutera indwara yibirayi.

Ifumbire y'amatungo, imborera, n'ifumbire mvaruganda bigomba kuvangwa neza n'ubutaka kugirango birinde gukoranaho n'ikirayi cyatewe. Banza ushyiremo ifumbire mborera, ukurikizeho ifumbire mvaruganda, hanyuma utwikirizeho itaka rifite hagati ya cm 5-10. Noneho utere ibirayi by'imbutu. Kugira ngo ushyiremo ifumbire nyuma yo kugaragara, cukura umwobo muto kuri cm 10-15 uvuye ku gihingwa ukoresheje inkoni. Shyiramo ifumbire hanyuma wuzuze ukoresheje intoki cyangwa inkoni.

Mu butaka busharira (ubutaka bufite pH muni ya 5.5), usibye ifumbire mborera n'ifumbire mva ruganda, hagomba kongerwamo n'ishwagara kugirango hirindwe imyunyu micye ndetse n'ubusharire mu butaka. Ishwagara igomba gukoreshwa mu gihe cyo gutegura ubutaka ku gipimo cya kg 25 - 50 kuri ari 1 (metero kare 100). Mu murima aho hashyizwemo ishwagara mbere, igipimo cya pH y'ubutaka kigomba gupimwa buri gihe cy'ihinga kugirango ibe yakongerwamo mu gihe pH igabanutse muni ya 5.5. Ishwagara itetse cyangwa idatetse ishobora gukoreshwa, ariko itayunguruye (travertine) niyo ibyara inyungu kuko iba idahenze. Gukoresha ifumbire mvaruganda za aside nka urea, di-ammonium fosifate na fosifate ya amonium bigomba kwirindwa mu butaka bwa busharira.

Igice cya 9: Uburyo bwo gutera



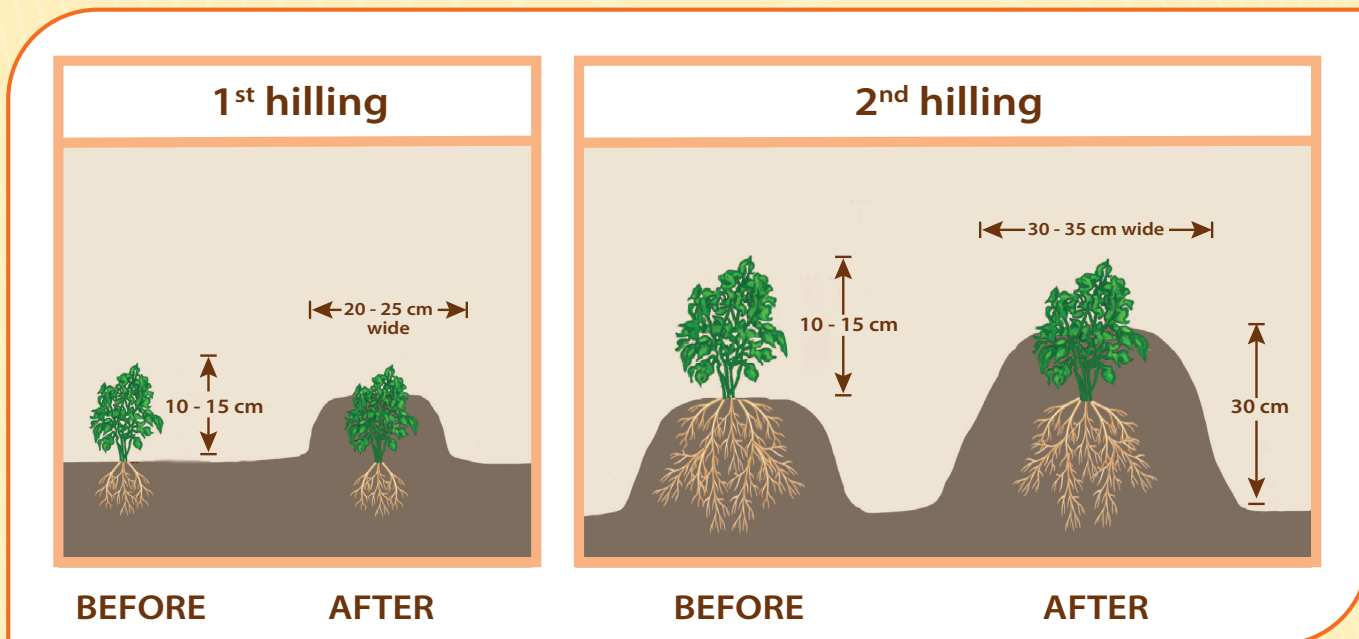
Genzura neza ko ibirayi by'imbutu bimeze neza kandi bifite imimero imeze kimwe mu ngano nka cm 1-2. Ibyumweru bine kugeza kuri bitandatu mbere yo gutera, uyu numero uhungurwa ibirayi bikiri mukigega, iyo umumero wambere ujeho uhita ukurwaho kandi akenshi nyuma y'ibyumweru 2 umumero wambere ukuweho hahita haza andi maso cyangwa imimero myinshi ,migufi, kandi yijimye. Kirazira kongera guhungura imimero yaje nyuma yoguhungurwa kumumero wa mbere. Iyi mimero yaje hamaze guhungurwa uwambere iteranwa nikirayiidahunguwe.

Ibi bizongera cyane umubare w'ibirayi by'imbutu bizasarurwa kuri buri gihingwa. Irinde ibirayi bishaje kandi byumye bifite imimero miremire, kandi yerurutse, iyi ishobora kuvaho mu gihe cyo gutera. Imimero migufi, ikomeye, imimero kandi y' icyatsi itanga icyizere ko iyo itewe, ikura vuba, ikagira imikurire imeze kimwe kandi ibirayi bigakura cyane. Ni ngombwa gufata neza ibirayi by'imbutu bimaze kumera neza mu gihe cyo gutwara, gupakira no gupakurura no gutera, kugirango wirinde kwangirika kw'imimero. Imbutu y'ibirayi yangijwe n' indwara n'udukoko ntigomba na rimwe gukoreshwa mu gutera. Menya neza ko ibirayi by'imbutu zingana (icyiciro) byatewe ahantu hamwe. Ibi bizaba bigaragara kimwe mu murima bityo bizorohereza imirimo yo kubyitaho. Ikindi iyo uteye ikirayi gifite amaso/imimero myinshi bituma kizana n'imyumba myinshi bityo nibirayi hasi bigashora cyane. naho iyo uteye ikirayi gifite umumero 1 kizana uruti/umwumba 1 bityo kikanashora bikeya.

Uduferegi cyangwa imyobo yo guteramo bigomba gutegurwa hashyirwamo intera hagati ya cm 70-75 cm. Mu mironko hagati, koresha intera iri hagati ya cm 20-30 ukurikije ingano yimbuto, cm 20 mu gihe ibirayi ari bito (hafi mm 30 z'umurambararo) na cm 30 ku birayi binini (hafi mm 50 z' umurambararo). Twabibutsa ko ibirayi by'imbuto biterwa byegeranye kuruta ibirayi byo kurya, kandi ibi bituma igice cyo hejuru gikura cyane bigafasha kurwanya ibyatsi byamera. Ibirayi bigomba gushyirwa ku bujakuzimu bwa cm 5 - 10 mu gaferegi cyangwa mu mwobo bifite imimero ireba hejuru mbere yuko itwikirwa.

Ahantu hahanamye uduferegi two guteramo cyangwai imyobo bigomba kugendana n'ubuhaname kugirango bigabanye isuri no gutembana itaka hagati y'imironko.

Igice cya 10: Kubagara no gusukira itaka



Igihingwa cy'ibirayi kigomba kubagarwa hakiri kare kugira ngo bigabanye gucuranwa urumuri, intungamubiri n'amazi hamwe n'ibyatsi bibi, ndetse no kwirinda ko ibyatsi bibi bicumbikira indwara n' udukoko. Kubagara bwa mbere bisanzwe bibaho nyuma yo kumera, mu gihe ibirayi bifite cm 10-15. Umurima ugomba kutabamo ibyatsi kugeza amababi yose yumwe.

Gusukira ni ukongera itaka ryinshi ahakijije uruti rw'ibirayi mu gihe bikiri bito kugirango wizereko imizi ishora ibirayi aho kuba hejuru yubutaka. Gusukira itaka byongera umubare w' ibirayi, bityo umusaruro w' imbuto ukiyongera. Birinda kandi ibirayi ibyonnyi n'indwara. Ibirayi byatewe ku butaka bushashe, ni ngombwa gusukira nibura inshuro ebyiri. Gusukira ubutaka ku nshuro ya mbere bikorerwa rimwe no kubagara, nyuma y' ibyumweru 2-3 ibirayi bimaze kumera. Bituma ubutaka bwiye umubare ahakijije uruti, bigatuma igihingwa kibyara ibirayi byinshi. Kuhira bwa kabiri, kandi by'ingenzi, biba nyuma y'ibyumweru 2-3, bitewe n'imikurire y'ibihingwa. Kuhira bwa gatatu ntaho ari ngombwa mu gutubura imbuto kuko bitera ibirayi kuba binini cyane. Nyuma yo kuhira ubutak aishuro 2, imitabo igomba kuba miremire, nibura cm 30-45 kuva aho umutabo utangirira ukagera hejuru, kandi ugomba kuba ukozwe neza, ufite umuzenguruko hejuru hamwe n'umuheto wa cm 90 kugirango ubemo ibirayi byinshi ndetse bifashe no kurinda ibirayi indwara n' udukoko. Buri gihe wita kureba ko ibirayi bitanamye hejuru.

Mu gihe cyo gusukira itaka, wirinda kwangiza imizi hamwe n'ibirayi. Niba bishoboka, koresha isuka ntoya ugereraniye nikoreshwa mu bindi bikorwa byo mu murima.

Igice cya 11: Kuvanamo ikibi



Kuvanamo ikibi, n' igikorwa cy'ingenzi gikorwa kugirango haboneke umusaruro w'imbutu nziza. Ibi bikorwa habaho igenzura rihoraho mu murima hanyuma ugakuramo igihingwa cyose kidasanzwe, harimo ibirayi n' imizi (reba imfashanyigisho nyobora). Ibihingwa bivanwa mu murima ni ibirayi birwaye (urugero, Kirabiranya), ibirayi bitari iby'ubwoko bw'imbutu (byavuye ku kwivanga kw'imbutu), cyangwa se kimeza yavuye ku birayi byasigaye mu murima mu bihe bishize.

Ku batubuzi b' imbutu z' ubucuruzi, kuvanamo icyibi ni ngombwa kuko imbutu zabo zishobora kwangwa mu gihe cyo gutanga icyemezo niba ibihingwa bidasanzwe bidakuweho. Menya ariko ko niba abagenzuzi babonye ibihingwa byinshi byarakuwe mu murima nk' imwe mu mpamvu zo gukuramo icyibi, bashobora kwemeza ko indwara yari ihiganje cyane, bityo, bakaba bamanura icyiciro cy' imbutu mu gihe cyo gusarura.

Kuvanamo icyibi bigomba gutangira mu gihe ibihingwa bigeze kuri cm 20-25 z'uburebure kandi bigomba gukorwa rimwe mu cyumweru kugeza igihe amababi y' ibirayi afunze mu mirongo. Nyuma yiki gihe, kunyura mu murima bigomba kubuzwa kugirango hirindwe kwanduza indwara (mfunyarazi, kirabiranya, n' izindi).

Kugenzura umurima bikorwa neza iyo bikoze mu gitondo, mu gihe hatariho izuba bityo bigafasha kumenya neza ibihingwa bidasanzwe. Ntabwo ari byiza kugenzura umurima nyuma ya saa sita kuko ibibabi bishobora kugaragara ko byumye nta ndwara iyo ari yo yose bifite. Ibirayi birwaye bigomba kurandurwa burundu hamwe n' ubutaka bitewemo (imigozi yose, imizi, ibirayi n' ubutaka). Ibihingwa bifite itaka bigomba gushyirwa mu gitebo cyangwa mu mufuka bigakurwa mu murima bikajugunywa mu rwobo rurerure. Niba bishoboka, ibihingwa bigomba gutwikirwa mu rwobo. Ishwagara cyangwa ivu ryo mu gikoni bishobora gukoreshwa mu mwobo aho igihingwa cyaranduwe kugira ngo byice indwara.

Igice cya 12: Kurwanya indwara y'imvura

Indwara y'imvura n'indwara y'uduhumyo itera igihingwa kunanirwa, ikangiza amababi, uruti n'ibijumba. Amababi n'uruti byanduye biba umukara, bikikunja ukaba wagirango byababutse. Indwara y'imvura kandi ituma ibibabi ku ruhande bijya gusa numuhondo werurutse ndetse bikazana n'uruhumbu rwera ku gice cyo hasi cy'ibibabi. Indwara y'imvura iterwa n'uduhumyo (phytophthora infestans) dukwirakwizwa n'umuyaga n'amazi kandi ikaguma mu birayi byanduye). Iyi ndwara irashobora gukwirakwira mu birayi kandi ibyafashwe birabora bikanuka.

Uburwayi bukomeye bubaho mu bihe bikonje iyo ubuhehere bw'umwuka buri hejuru (hejuru ya 90%). Indwara ikwirakwira vuba mu murima kandi, iyo itagenzuwe, ibihingwa byanduye bipfa mu cyumweru kimwe.

Indwara y'Imvura ishobora kurwanywa binyuze mu:

- 1) Gutera imbuto nziza itarwaye.
- 2) Gukoresha amoko y'imbuta yihanganira indwara (niba aboneka).
- 3) Gukusanya no gutwika imigozi y'ibirayi nyuma yo gusarura.
- 4) Gutera umuti urwanya ubuhumyo ku gihe kugirango wirinde kwandura ndetse wice n'indwara nyuma yo kwandura uyirinde gukwirakwira.

Imiti myinshi irwanya uduhumyo izwiho kurwanya indwara y'Imvura iyo ikoreshejwe nkuko byateganijwe. Amatsinda abiri y'ingenzi y'imiti yica udukoko asanzwe akoreshwa mu guhashya iyi ndwara. Itsinda rya mbere rurimo imiti irinda uduhumyo dutera indwara iyo uhuye n'igihingwa. Urugero rw'iyi miti ikoreshwa n'abahinzi b'ibirayi mu Rwanda ni Mancozebe (Ditane). Iyo miti irinda uduhumyo (Detani) ni byiza kuyikoresha hakiri kare ibirayi bikimera mu rwego rwo kubikingira, ariko ntigira icyo ikora iyo ibirayi byamaze kwandura. Itsinda rya kabiri rigizwe n'imiti irwanya indwara, ihura n'igihingwa, ikinjiramo imbere, ikazenguruka kugirango yice udukoko dutera indwara. Iyi miti ikoreshwa nyuma kugirango irwanye indwara mu gihe imaze kwandura igihingwa ndetse n'ibimenyetso byagaragaye.

Nyamara ariko, iyi miti yinjira mu gihingwa imbere ishobora nayo gukoreshwa hakiri kare mu gihe bigaragarako indwara y'imvura ishobora kuhibasira (imvura nyinshi, hamwe n'indwara biboneka aho hantu ndetse no mu kirere). Urugero rwiyo miti yinjira mu gihingwa imbere kandi ikoreshwa kenshi n'abahinzi b'ibirayi mu Rwanda ni Ridomil.

Ni ngombwa kudahora ukoresha imiti imwe kuko igihe kigera uwo muti ntushobora gukomeza kurwanya cyangwa kugabanya indwara. Niyo mpamvu, ari ngombwa guhinduranya imiti ikoreshwa ndetse n'ubwoko butandukanye hagati ya buri uko uteye. Ntukavange imiti itandukanye mu gihe kimwe cy'itera, kirazira kuvanga Dethani na Ridomili .

Imiti yica udukoko igira ingaruka mbi ku buzima bw'uyitera ndetse n'ibidukikije, kandi byongeye, irahenze. Niyo mpamvu, ari ngombwa gukurikiza gahunda isabwa yo gutera imiti yica udukoko kugirango ikore neza.

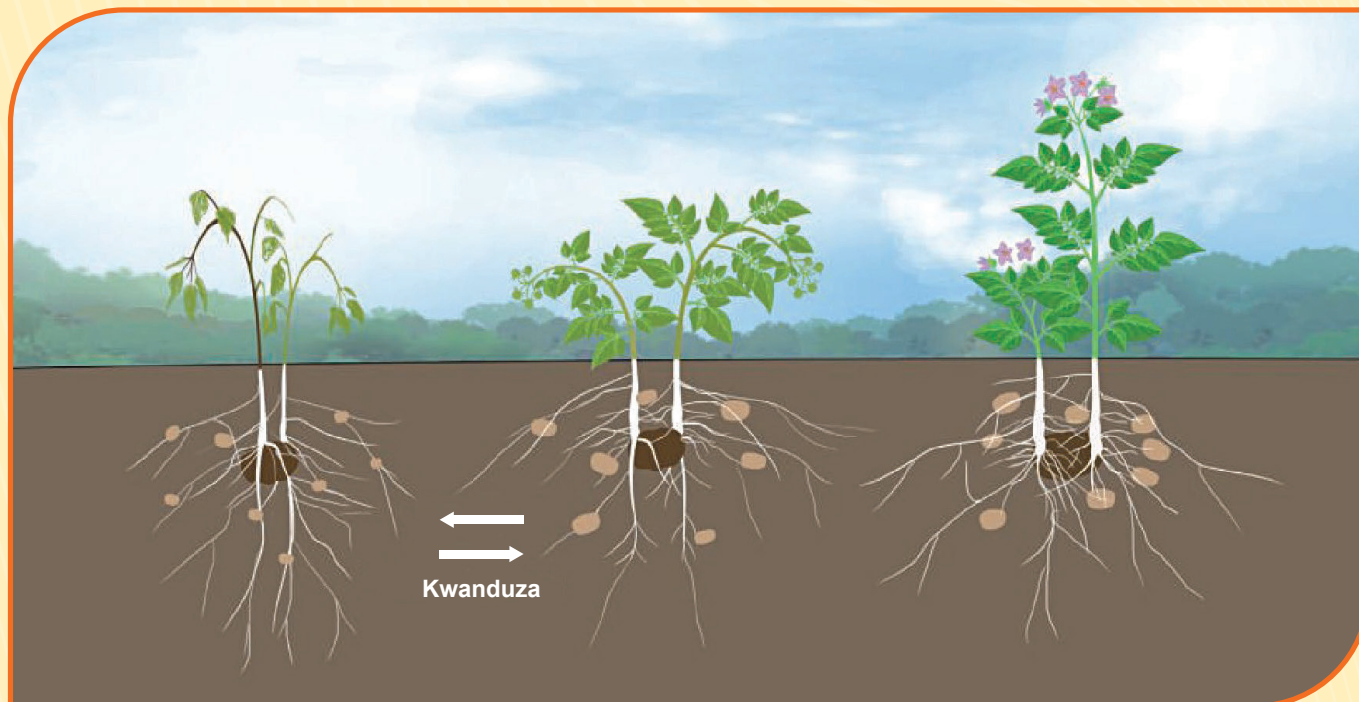
Gahunda isabwa yo gutera imiti irwanya indwara y'imvura niyi ikurikira:

- 1) Bwa mbere, koresha umuti urinda indwara ariwo detani cyangwa Mancozeb Ibirayi bimaze kumera nibura bifite uburebure bwa cm 10. Igihe cyo gutera umuti n'ingenzi cyane.
- 2) Tera umuti urwanya indwara nyuma y'ibyumweru bibiri, ni ukuvuga, nyuma yiminsi 40 - 45 nyuma yo gutera, igihe bigaragarako indwara y'imvura ishobora kuhibasira (imvura nyinshi, hamwe n'indwara biboneka aho hantu ndetse no mu kirere).
- 3) Gutera umuti bikurikiyeho, koresha umuti urwanyiriza indwara inyuma y'igihingwa buri nyuma y'ibyumweru 2 kugeza igihe amababi azahinduka umuhondo bitewe no kwera, usibye ariko mugihe ibimenyetso by'indwara bikigaragara mu murima. iyo Detani inaniwe warakingiye ariko ukabona byanze byahiye niho utera umuti wogukiza witwa Ridomil.
- 4) Mu gihe ibimenyetso by'indwara bikigaragara mu murima, tera umuti urwanya indwara. Ibimenyetso nibimara gushira, subira gutera mu gihe cy'ibyumweru 2 umuti usanzwe urinda indwara.

Mu byukuri, imbuto z'ibirayi zihanganira indwara ntizagombye guterwa umuti urwanya indwara inshuro zirenze ebyiri mu gihe cy'ihinga. Ibi biterwa nuko iyo miti irahenza kandi yatera ubudahangarwa udukoko dutera indwara, byongeyeho iba ari n'uburozi ku bidukikije.

Buri uko uteye, koresha ibipimo by'umuti nkuko bisabwa nuwawukoze. Urasabwa kutarenza urugero rwateganijwe menya ko kurenza urugero rwateganijwe bidatanga inyungu zinyongera ahubwo ni ingaruka mbi zitifuzwa. Umuti urinda indwara (nka Mancozebu igomba gukoreshwa byibuze amasaha 6 mbere yuko imvura igwa kugirango wirinde ko imvura iwukura ku mababi. Umuti urwanya indwara (nka Ridomili) igomba gukoreshwa byibura amasaha 3 mbere yuko imvura igwa. Amababi agomba kuba yumutse adafite urume. Gutera umuti ntibigomba gukorwa ahagana saa sita, mu gihe hari izuba ryinshi.

Igice cy'ya 13: Kurwanya Kirabiranya



Indwara ya Kirabiranya ituma igihingwa cyuma igice cyangwa cyose n'ubwo haba hari amazi ahagije mu butaka. Mu kuma igice, imigozi y'ibirayi imwe iruma, iyindi isagaye ikagaragara neza nkitarwaye. Iyo indwara ikiri nkeya, ikirayi kisubiza ubuzima nijoro ariko iyo indwara yabaye nyinshi, ikirayi ikirayi ntigishobora gukira. Iyo ikirayi cyanduye ugiciyemo kabiri, ubona impeta zisa n'umukara cyangwa zirabuye. Rimwe na rimwe, ubona amata ameze nk'amazi ava mu maso y'ibirayi ndetse n'ubutaka bufashe ku maso y'ibirayi mu gihe cyo gusarura.

Indwara ya Kirabiranya ishobora kwanduza igihingwa mu byiciro byose by'imikurire yacyo kandi igihingwa kikuma cyose. N'indwara iba mu butaka n'imbuto icyarimwe. Udukoko dutera iyi ndwara dushobora kuba mu butaka imyaka myinshi. Umugozi n'ibirayi birashobora kwandura ariko ntibigaragaze ibimenyetso, ibi byitwa "Ubwandu bwihisha". Gukoresha ibirayi byavuye kuri iyo migozi bishobora gukwirakwiza indwara. Indwara ya Kirabiranya kandi yanduza ibihingwa byo mu muryango umwe n'ibirayi nka chili, urusenda, inyanya, itabi, n'intoryi, ndetse n'ubwoko bwinshi bw'ibyatsi. Ishobora gusuzumwa mu gihingwa winjiza agace gato k'uruti mu kirahure cy'amazi (reba imfashanyigisho). Indwara ya Kirabiranya umwihariko wo gusohora ururenda ku ruti rukumanuka mu mazi.

Indwara irashobora gukwirakwira iva mu murima ijya mu wundi cyangwa kuva migozi imwe ijya ku yindi mu murima bitewe n'imbuto zanduye, amazi, ubutaka, ibikoresho byo guhinga, amatungo n'abantu. Nta miti iba ku isoko irwanya Kirabiranya. Ku bw'ibyo inzira imwe rukumbi ni ukuyirwanya binyuze mu buryo bw'imihingire bukurikira:

- 1) Gutera imbuto itarwaye mu mirima utarimo Kirabiranya.
- 2) Guhinga imbuto zihanganira indwara.
- 3) Guhinduranya ibirayi n'ibindi bihingwa bitari mu muryango umwe nk'ibinyampeke n'ibinyamisogwe nibura mu gihe cy'ibihembwe by'ihingwa 4.
- 4) Gukoresha ifumbire mborera itarimo Kirabiranya.
- 5) Kurandura imigozi y'ibyumye hamwe n'ubutaka bubikikije. Imigozi yaranduwe n'ubutaka bigomba gukusanyirizwa mu mufuka cyangwa mu gitebo, bikavanwa mu murima w'ibirayi, bikajugunywa mu rwobo kure y'imirima y'ubuhinzi, hanyuma bigatwikwa. Ubu buhanga bwo kurandura ibirwaye wabureba mu mfashanyigisho ngiro. Ntugashyire imigozi yanduye aho uri gukorera ifumbire. Ishwagara cyangwa ivu ryo mu gikoni bishobora gukoreshwa mu mwobo aho igihingwa cyaranduwe kugira ngo byice indwara.

- 6) Gusukura ibikoreshe byakoreshejwe mu buhinzi nk'amasuka kugirango birinde gukwirakwiza ubwandu (wakoreshe umuriro cyangwa indi miti nka Jike). Karaba neza intoki ndetse usukure inkweto n'imyenda wakoresheje.
- 7) Shyira urumambo hejuru y'ibimba, ahantu hose havuye ikirayi kirwaye Kirabiranya. Sarura ibirayi bibiri byegeranye n'icyaranduwe, ubishyire ku ruhande, ubuguriske cyangwa ubirye n'ibirayi bisanzwe.

Igice cya 14: Kurwanya Kabore



Kabore iterwa n'uduhumyo dufite umwihariko wo guhindura ingira buzima fatizo mu mazi cyangwa kubora byoroshye. Ibimenyetso ku kirayi byibanda cyane ku gice cyo hepfo y'uruti, bigatera ibikomere byirabura muni y'uruti. Ibirayi birwaye birabura haba mu murima cyangwa mu buhunikiro kandi bigatanga impumuro mbi. Ubushuhe bwinshi bw'ubutaka butuma udukoko dufata ibirayi n'uruti, bigatera igihombo kinini.

Indwara ikwirakwizwa mu buryo busa nubwa Kirabiranya. Indwara rero irashobora kurwanywa kandi hakoreshejwe ingamba zimwe nkiza Kirabiranya

Igice cya 15: Kurwanya indwara y'Imfunyarazi



Indwara z'imfunyarazi (virusi) zigabanya umusaruro kandi zishobora kwanduza ibindi byiciro by'imbutu mu gihe imigozi yerekana ibimenyetso bya virusi bitahita bivanwaho. Ibi n'ibibazo cyane cyane mu gutubura imbutu. Igihingwa cyose cyanduye rero kigomba kuanwaho vuba kugirango birinde gukwirakwira ku bindi bihingwa. Niba ushidikanya niba igihingwa cyanduye cyangwa kitanduye, ni byiza kugikura mu murima. Virusi ikwirakwizwa byoroshye binyuze mu bikoreho by'ubuhinzi byanduye, guhura kw'igihingwa cyanduye nikizima, abantu bagenda hagati y'imirima, hamwe n'udukoko.

Indwara z'imfunyarazi ziragoye kuzimenya mu murima. Iyo indwara yoroheje, igihingwa ntigishobora kwerekana ibimenyetso byayo na gato. Ariko, iyo abatubuzi b'imbutu nibamara kubimenya neza, ibimenyetso bikomeye by'indwara bishobora kugaragara byoroshye. Ni gacye igihingwa cyafashwe na virusi zituma gipfa. Indwara z'imfunyarazi ni gake zitera igihingwa gupfa. Ibimenyetso, iyo bihari, bihindura imiterere nyayo y'igihingwa. Muri byo harimo amababi ahinduka, akibumbabumba, amababi aba magufi kandi menshi, amababi areruruka ndetse agahinduka n'umuhondo.

Imwe mu ndwara z'imfunyarazi y'ibirayi ishobora kumenyekana byoroshye ni virusi itera amababi gupfunyarara, akibumbabumba. Igihingwa cyanduye iyi virusi cyerekana amababi mato yibumbye, tureba hejuru tugahinduka umuhondo wijimye kandi iyo udukanze wumva yoroshye kandi avunagurika.

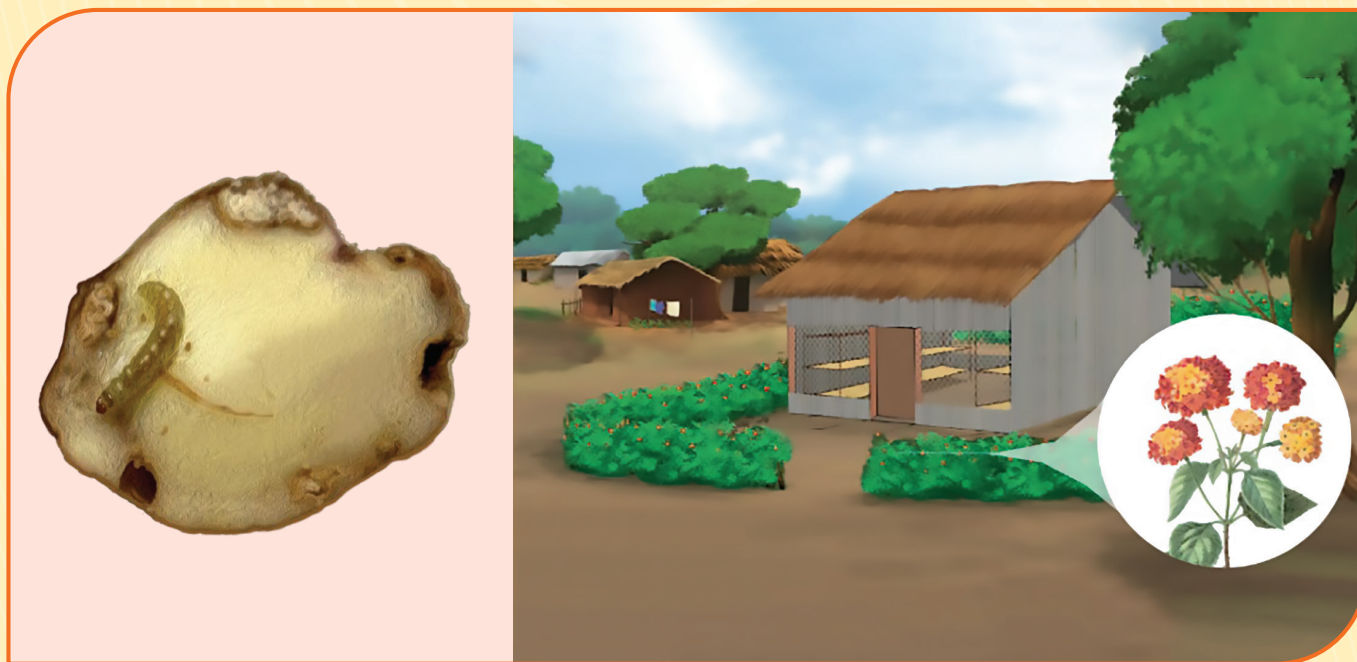
Indi ndwara y'imfunyarazi ishobora kumenyekana byoroshye ni iterwa na virusi ya mozayike. Amababi yafashwe areruruka agahinduka umuhondo (reba imfashanyigisho ngiro).

Hariho ubwoko bwinshi bwa virusi kandi akenshi umurima cyangwa igihingwa byanduye virusi zirenze imwe zitera ingaruka. Kubera ko nta ngamba zihariye zo kugenzura buri virusi, ntukishinje kuba utazi virusi zitandukanye. Icyangombwa ni ugushobora gutandukanya igihingwa gisanzwe (kitarwaye) n'igihingwa kirwaye.

Indwara z'imfunyarazi zirwanywa mu buryo bukomataniye, burimo:

- 1) Gukoresha imbuto nziza. Bitera ingaruka cyane guhitamo ibirayi by'imbuto ukurikije ubunini bwabyo (guhitamo ibirayi bito nk'imbuto), Nk'ibirayi byanduye muri rusange byera ibindi ibirayi bito.
- 2) Gutera ubwoko bw'ibirayi byihanganira indwara za virusi.
- 3) Kurandura no kuvanaho ibirayi byanduye mu murima, hanyuma ubitwike mu rwobo rurerure. Ntugashyire ibirayi byanduye nkibizavamo ifumbire mborera.
- 4) Sukura ibikoresho by'ubuhinzi nkamasuka mbere na nyuma yo kuyikoresha kugirango wirinde gukwirakwiza ubwandu (urugero: koresha umuriro cyangwa Jike).
- 5) Kurinda umurima hamwe nibiwukikije ibyatsi bibi kuko bishobora kubika virusi zanduza ibirayi.
- 6) Kurwanya udukoko dushobora gukwirakwiza indwara za virusi. Udukoko tunyunyuzwa nk' uduhunduguru, imiswa, urunyo, amasazi dukwirakwiza indwara ya virusi. Imiti yica udukoko ishobora guterwa mu gihe uduhunduguru twatangiye kugaragara muni y'amababi cyangwa utundi dukoko tugaragara ku mababi. Menya ko imiti yica udukoko, yangiza ubuzima bw'abantu n'ibidukikije kandi igomba gukoreshwanya ubwitoni bwinshi.

Igice cya 16: Kurwanya imungu y'ibirayi



Imungu y'ibirayi iterwa n'ikinyugunyugu na none hamwe bayita urunyo rw'ibirayi, yangiza igihingwa mu murima kandi ikimukana n'ibirayi kugera mu bubiko. Urunyo rwinjira mu kirayi runyuze mu maso rugakora umwenge mu kirayi. Urunyo rushobora kandi gukora imyenge mu ruti. Zikomeza kororoka no mu birayi bibitswe bigatera igihombo kinini. Mu kigega, ibirayi byanduye biba byumye ugereranijwe n'ibitarwaye.

Imungu y'ibirayi ishobora kurwanywa hakoreshejwe:

- 1) Irinde gutera mu butaka bworoshye cyane, kuko ibi bituma ibirayi bijya hejuru ku butaka maze ibinyugunyugu bigateraho amagi yazod loose soil, as this facilitates exposure of tubers on which the female moths can deposit their eggs.
- 2) Gusukira ubutaka cyane kugirango urinde ibirayi. Birinda ibirayi guhura n'umwuka unyuzwa mu butaka;
- 3) Kugenzura ibirayi witonze mbere no mu gihe cyo kubihunika, gukuramo buri kirayi gifite imyenge
- 4) Gukoresha ibimera nka Lantana n'intururu bitangwa impumuro itera inyenzi kuguruka kure y'ubuhunikiro. Ibi bita bishobora guterwa hafi y'ikigega cy'imbuto cyangwa amababi yabyo ashobora gushyirwa hejuru y'imbuto y'ibirayi mu kigega.
- 5) Gutera mu murima umuti wabugenewe wica udukoko buri gihe cy'ibyumweru 2-3. Gutera umuti bwa mbere bishobora gutangira nyuma gato yo kumera. Menya ko umuti wica udukoko wangiza ubuzima bw'abantu n'ibidukikije bityo ugomba gukoreshwa mu bwitonzi.

Igice cya 17: Kurwanya amavunja y'ibirayi



Ibirayi byarwaye amavunja bishobora kwerekana urwego rutandukanye rwo kugwingira, amababi akaba umuhondo ndetse ikirayi kikamera nk'icyumye mu gihe hari ikibazo cy'ubuhehere. Ubwoko bubiri bw'amavunja buzwi mu buhinzi bw'ibirayi ni: potato root-knot nematodes na potato cyst nematodes. root-knot nematodes nizo zikwirakwiriye kw'isi yose. Bifata ibirayi bikabitera inenge ituma bidashora kugurishwa ku isoko. Ibirayi byayirwaye, bishobora kwandura indwara ya Kirabiranya byihuse.

Kwangizwa kwa cyst nematode bikunda kwigaragaza cyane mu murima urimo ibirayi bikura. Igihingwa kiragwingira, kikeruruka cyangwa kigagira umuhondo wera ndeste cyikuma. Ibi bimeneytso biganisha ku igabanuka ry'umusaruro n'ibirayi bito. Hashobora gushira imyaka 20 kuva nematode yinjiye mu murima kugeza ibimenyetso bigaragaye mu murima. Menya kandi ko ntacyo bitwaye kurya ibirayi birwaye nematode. Ntuzigere ukoresha nk'imbuta ibirayi byarwaye nematode.

Kurwanya nematode, ni ukugerageza nibura guhagarika kororoka kwazo ukageza ku kigero cyo hasi gituma zitakwangiza. Kuzirwanya kwiza ni ukuzirinda kuko biragoye kuzivana mu murima iyo zamaze kuboneka. Ibikorwa byo kuzirinda harimo:

- 1) Guhitamo neza imirima itanduye.
- 2) Guhinga ibirayi byimbuto nziza. Ntuzigere ukoresha ibirayi by'imbuta byasaruwe mu murima wanduye.
- 3) Niba nematode imaze kuboneka mu murima, tegereza nibura imyaka 5 mbere yo kongera guteramo ibirayi kandi wirinda ibihingwa biri mu muryango umwe n'ibirayi, urugero, inyanya, intoryi, urusenda.
- 4) Guhinga ubwoko bw'ibirayi bwihanganira indwara ya nematode.

Igice cya 18: Kunyomora



Kunyomora ni igikorwa cyo kvanaho cyangwa gusenya imigozi y'ibirayi mbere yuko byera neza. Intego yo gutubura imbuto ntabwo ari ukongera umusaruro w'ibirayi mu buremere, ahubwo ni ugusarura umubare munini w'ibirayi by'imbuto bifite ubunini buringaniye. Ku bwibyo, Kunyomora ku gihe ni igikorwa cy'ingenzi mu butubuzi bw'imbuto kuko bihagarika imikurire (ubunini) bw'ibirayi. Kunyomora kandi bikomeza uruhu rw'ibirayi bikarurinda kwangirika no kwandura indwara mugihe cyo gusarura, gutwara, no guhunika. Na none kandi, ibi ni ingenzi cyane cyane mu gutubura imbuto kuko ibirayi by'imbuto bihunika igihe kirekire kuruta ibirayi byo kurya kandi ubwiza bw'imbuto bushobora kwangizwa n'udukoko n'indwara mu gihe ibirayi byakomeretse mugihe cyo gusarura

Amoko y'ibirayi agira ibihe bitandukanye byo kwereaho. Niyo mpamvu ari ngombwa buri gihe gukurikirana ingano y'ibirayi iyo bigeye kwera kugirango umenye ubunini bw'imbuto. Mu gihe kuzana indabo bigeye kurangira (nko mu minsi 80 nyuma yo gutera), injira mu murima rimwe mu cyumweru hanyuma ucukure ibirayi bike. Iyo **hafi 75% y'ibirayi** bigeze ku **kigero cya mm 28-55** (hafi y'ubunini bw'igi ry'inkoko), kunyomora bigomba guhita bitangira ako kanya. Niba warahinze ubwoko burenze bumwe, buri bwoko bugomba kugenzurwa ukwabwo nkuko ubwoko butandukanye bwerera igihe gitandukanye. Ku bwibyo, igihe gikwiye cyo kunyomora gitandukana bitewe na buri bwoko bw'imbuto.

Mu kunyomora, imigozi y'ibirayi ishobora gutemwa na sekateri cyangwa umuhoro, icyakora ibi bifite ibyago byo kwandura kirabiranya n'izindi ndwara mubirayi by'imbuto. Uburyo bwiza bwo kunyomora ni **ugukurura imigozi** y'ibirayi mu gihe uhagaze ku mpande zabyo (reba imfashanyigisho ngiro). Ibirayi biguma mu butaka mu gihe imigozi yakuwe mu murima igatwikwa cyangwa ikajugunywa mu rwobo. Ibishibuka bizaho (niba bihari), bigomba kongera gutemwa nyuma y'icyumweru unyomoye kuko amababi y'ibishibuka akurura uduhunduguru dukwirakwiza virusi. Uburyo bwa gatatu bwo kunyomora ni ugusenya imigozi y'ibirayi ukoresha imiti yabugenewe, ariko ibi birahenze cyane kandi bigira ingaruka mbi ku bidukikije no ku buzima bw'abayikoresha.

Igice cya 19: Gusarura, Gutoranya no gutondeka ibirayi



Gusarura bigomba gukorwa mu gihe uruhu rw' ibirayi rumaze gukomera bihagije, ni ukuvuga ibyumweru 2 - 3 nyuma yo kunyomora. Mu gihe cy' ubushuhe kandi mu gihe harikibazo cy' inyenzi y'ibirayi, gusarura bishobora gukorwa nyuma yicyumweru 1. Kugirango umenye igihe gikwiye cyo gusarura, fata ikirayi hanyuma ugishyire mu kiganza ugikomeze. niba ibirayi bitari gukoboka, ni igihe gikwiye cyo gusarura.

Gusarura biba byiza iyo bikozwe mu gihe ubutaka bwumutse, ariko ikirere kigomba kuba gicyeye, kuko gusarura mu mvura bishobora gutera ibirayi kubora. Gusarura bigomba gukorwa buhoro buhoro uva mu ruhanda rumwe rw' umurima ujya mu rundi ruhanda ku buryo mu gihe imvura igiye kugwa, abahinzi bashobora guhagarara bagatangira kwegeranya ibirayi byasaruwe kugirango babirinde kunyagirwa n' imvura. Gusarura ku gihe bishobora gufasha kwirinda indwara n' udukoko kwangiza ibirayi. Ibirayi biva ku migozi yarwaye bigomba gusarurwa bigakusanywa nyuma yibindi byose, bigashyirwa ku ruhanda.

Uburyo bwo gusarura bushobora kugira ingaruka ku bwiza bw' imbuto. Ni ngombwa gucukura buhoro kugirango wirinde gukomeretsa ibirayi. Kugira ngo wirinde kwangirika, si byiza guterera ibirayi kure. ibirayi bifatwa nk'amagi, kirazira gusarura ujugunya ibirayi kuko gishobora guhura n'ibuye cyangwa kikagwa kukindi kirayi bityo bigakoboka cyangwa kikagira ipfukunyira ituma ibirayi bisa numukara bigeze mukigega Ibirayi by' imbuto ntibigomba na rimwe kumanurwa ku burebure burenga cm 30. Ibirayi bishobora gusarurwa ukoresheje intoki cyangwa imashini. Muri byose, ibikoresho bigomba gusukurwa mbere yo gusarura. Ukoresha ibindi bikoresho byo gusarura bitari ibyakoreshejwe mu gusarura ibirayi bisanzwe, kugira ngo wirinde indwara zakwandura bivuye ku bikoresho byakoreshejwe mbere. Iyo usarura n' intoki, hari inzira ebyiri: gusarura n' intoki cyangwa gukoresha isuka. Gusarura n' intoki bifata igihe kirekire kandi bitanga akazi kenshi, ariko bitanga umusaruro mwiza utangiritse. Gukoresha isuka ntibitwara igihe kinini kandi bigabanya akazi, ariko ibirayi bimwe bishobora kwangirikira mu gikorwa. Gukoresha imashini (taragiteri), bitanga akazi gacye kandi birihuta ugereranije no gusarura n' intoki, cyane cyane iyo umurima ari munini (hejuru ya ha 1).

Nyuma yo gusarura ibirayi, ugomba kubirekera hasi mu gihe gito kugirango ubutaka bwume ndetse buve ku birayi. Nyamara, ibirayi ntibigomba gusigara ku zuba ryinshi igihe kirenze igisabwa cyo kumuka (amasaha 2 atarenze). Gutoranya no gutondeka bigomba gukorwa mu murima ako kanya nyuma yo gusarura, mbere yo gupakira ibirayi. Gutoranya bikubiyemo gukuramo ibiboze, ibirwaye, ibyanduye ndetse byatemweho mbere guhunika. Ibirayi bivuye ku migozi irwaye bigomba gukusanywa bwa nyuma, bigakoreshwa mu kurya, ntibifatwe nk'imbuto.

Gutondeka ibirayi bikorwa utandukanya ibirayi by'imbuto mu byiciro bitandukanye mu bunini. Imbuto y'ibirayi isanzwe ipima hagati ya mm 28-55 z'umurambararo. Hariho ibyiciro bitatu by'ubunini bw'imbuto zisabwa kugurishwa mu Rwanda: mm 28-35 mm (imbuto ntoya), mm 36-45 (imbuto igereraniye), na mm 46-55 (imbuto nini). Umutubuzi w'imbuto agomba kwita ku byiciro bitandukanye mu gihe ashiraho ibiciro by'imbuto. Ubusanzwe, imbuto nini igurishwa ku giciro gitoya ugereraniye n'imbuto ntoya.

Nyuma yo gutoranya no gutondeka amanota, ibirayi bigomba gukusanywa neza mu bisanduku cyangwa kureti zisukuye neza. Imifuka yakoreshejwe mbere mu gupakira ibindi birayi, ntigomba kongera gukoreshwa kugirango wirinde ikwirakwira ry'indwara. Uruhu rushobora kuba rworoshye kandi rwangiritse muri iki gihe, ni ngombwa rero kubikorana ubwitonzi. Nyuma yo gusarura, gabanya inshuro ukorakora mu birayi. Nyuma yo gusarura, ugomba gusukura umurima, ukusanya, ugataba imigozi y'ibirayi cg ibirayi biboze. Iki n'igice cy'ingenzi mu kurwanya ibyonnyi n'indwara zitandukanye, uvanaho inzira zose uburwayi bwakwinjiramo mu gihe cy'ihinga gitaha.

Igice cya 20: Guhunika imbuto y'ibirayi



Uburyo bwiza bwo guhunika imbuto nyinshi y'ibirayi izaterwa mu gihembwe cy'ihinga gitaha ni uguhunika mu Kigega cyinjiza urumuri (DLS). Iki kigega kirahendutse kandi kiba gikoze mu bikoresho biboneka byoroheje kandi bituma uhunika ibirayi ku rugero rwiza ku ma etajeri, kureti cyangwa ibisanduka bisanzwe bituma ibirayi bibona urumuri bikanahumeka neza. Ibigega byinjiza urumuri bituma urumuri rwinjira igice ariko hatabona cyane (hagomba kuba harimo urumuri rutuma wasoma ikinyamakuru, rutarenze cyangwa ngo rugabanuke). Ibi bituma hazaho imimeru migufi, ikomeye kandi ifite ibara, kandi ni byiza ku mutubuzi w'imbuto. Ibirayi bigomba gutondekwa kuri epeseri ntoya (ibirayi 2-3) ku buryo buri kirayi kibona urumuri ruhagije kandi ibirayi byose bibashe kugenzurwa byoroshye. Nibyiza kubirindura ibirayi muri etageri nibura incuro imwe mubyumero bibiri mugihe byazanye umumero 1.

(DLS), gikozwe kuburyo habaho ubuhumekero kuko ibirayi bimeze nk' ibindi binyabuzima byinjiza umwuka wa ogisijeni (Oxygen) kandi bigasohora umwuka wa karuboni (carbon dioxide CO²). Hatabayeho guhumeka neza, imyuka ya karuboni iba myinshi ikazamura ubushyuhe imbere mu kigega maze bigatera kumera hakiri kare. Ikigega cy'ibirayi by'imbutu kigomba kuba kinjiza umuyaga, kiwusohora kandi gifite ibati ribona hejuru aho urumuli runyura.

Urugero rwiza rw'ikigega cyinjiza urumuri (DLS), kiba gifite urukuta rw'imbaho zitegeranye cyane zometse ku bitu kugira ngo urumuri n'umwuka byinjire, gifite igisenge cy'amabati. Kugirango habeho guhumeka bihagije (gutembera no gusohoka k' umwuka), hagomba kubaho umwanya hagati y'imbaho zikoreshwa kurukuta (byibuze santimetero 2.5). Ukurikije ubunini bw'ikigega ushobora gushyira ibati ribonerana rimwe cyangwa menshi ku gisenge kugirango habeho urumuri ruhagije rugera ku mbuto ziri hagati mu kigega. Uruhande rw'imbere ruba rugomba kuba ruriho agatimba (kameze nka supanet) kugirango kabuze udukoko cyangwa imungu y'ibirayi kwinjira mu kigega. Ingamba zikomeye z'isuku zirimo gushyira umuti urinda indwara (urugero: Jike) ku muryango w'ikigega igomba kubahirizwa.

Bitewe n'uburebure bw'ikigega, ama etajeri (afite ubugari bwa m 0.8-1m) agomba gukorwa yegereye urukuta kandi akaba atandukanijwe na santimetero 50-60 hagati yazo. Ku kigega kinini, etajeri z'inyongera zishobora kubakwa hagati. Umwanya uhagije wo kunyuramo mu gihe cyo gusura no kugenzura ibikorwa ni ngombwa. Kugirango ugabanye ibiciro, ibikoresho biboneka mugace urimo nk'imbabari (ibiti bakase), inkingi z'ibiti ndetse n'ibyatsi byo gusakara bishobora gukoreshwa.

Ubwoko butandukanye, ibyiciro, imbuto n'inkomoko by'imbutu bigomba guhunika kuma etajeri atandukanye cyangwa ku masanduka na kureti zanditseho neza. Ikirango kigomba kwerekana izina ry'imbuto, ikiciro ndetse n'itariki yo gusurura. Umutubuzi w'imbutu agomba guhora akuramo ibirayi biboze, akanagenzura udukoko nk'isazi n'imungu z'ibirayi imbere n'inyuma mu kigega. Ibice byanduye bigomba gusukurwa ukoresheje imiti (urugero: Jike). Ikigega cyose kigomba gusukurwa nyuma yo kugurisha cyangwa gutera imbuto na mbere yo guhunika imbuto y'igihembwe gitaha. Kugirango wihutishe kumera, niba bikenewe, ibirayi ushobora kubipfuka n'amakoma y'urutoki. Iyo utwikiriye ibirayi n'amashami y'ibiti cyangwa ibimera ibyari byose, ni ngombwa kumenya neza ko ibirayi bikeneye guhumeka kandi ubuhehere ntibube bwinshi cyane munsu munsu kuko ibyo bitera kubora. Ibyumweru 4-6 mbere y'igihe giteganijwe cyo gutera imbuto, umumero wa mbere ugomba gukurwaho kugirango havuke ku kirayi indi mimero myinshi.

Imigereka

Umugereka wa 1: Imiterere y'amoko y'ibirayi aboneka mu Rwanda

Izina ry'imbuta	Kode	Umwaka yashyizwe ahagaragara	Igihe yerera (iminsi)	Umusaruro (t/ha)	Iminsi imerera	Aho yera	Ibiyiranga
Victoria	978001-1	1996	90-110	25	40	Imisozi miremire	Iroza, blfatwa cyane n'Imvura, biratogoswa, bikorwamo ifiriri
Gikungu	381233-24	1992	100-120	35	85	Imisozi miremire	Umutuku, yihanganira Imvura, biratogoswa, bikorwamo amafiriri
Kigega	384672-1	1992	100-120	40	70	Imisozi miremire	Umutuku, yihanganira Imvura, bikorwamo amafiriri
Mizero	386003-2	1992	100-120	40	55	Imisozi miremire	Umweru, yihanganira Imvura
Mugogo	383140-6	1992	100-120	25-30		Imisozi miremire	Umweru, yihanganira Imvura
Nderera	381391-13	1992	100-120	35		Imisozi miremire	Umutuku, byihanganira Imvura
Ngunda	381233-24	1992	100-120	50	70	Imisozi miremire	Umweru, yihanganira Imvura
Mabondo	8212-6	1989	100-120	30-35	40	Imisozi miremire	Umweru, amaso atukura, byihanganira Imvura, bikorwamo ifiriri
Kirundo	8212-5	1989	100-120	30	40	Imisozi miremire	Umweru, yihanganira Imvura
Cruza	720118-13	1985	120-130	20-30	30	Imisozi miremire	Umweru, byihanganira Imvura na Kirabiranya, bamera vuba
Gasore	Graso- 28	1983	90-100	10-18	30	Imisozi miremire	Yera vuba, ikorwamo ifiriri
Kinigi	378699-2	1983	100-120	20-30		Imisozi miremire	Umutuku, yihanganira Imvura, biratogoswa, bikorwamo amafiriri
Marirahinda	384216-7	1983	100-120	30-40	85	Imisozi miremire	
Nseko	720055-8	1983	100-120	20-30		Imisozi miremire	

Izina ry'imbuto	Kode	Umwaka yashyizwe ahagaragara	Igihe yerera (iminsi)	Umusaruro (t/ha)	Iminsi imerera	Aho yera	Ibiyiranga
Sangema		1983	100-120	20-25	110	Imisozi miremire	Iroza, byihanganira gacye Imvura, biratogoswa, bikorwamo ifiriri
Gahinga	370097-12	1983	100-120	20-40		Imisozi miremire	Umutuku, byihanganira Imvura
Nkunganire	CIP 393280.64	2018	90-120	30-35	>120	Imisozi miremire	Umutuku, yihanganira Imvura, yihanganira gacye Kirabiranya, biratogoswa, bikorwamo amafiriri
Ndeze	CIP 398190.615	2018	90	20-25	90	Imisozi miremire	Umweru, byihanganira Imvura, biratogoswa, bikorwamo ifiriri
Twihaze	CIP 393371.58	2018	100-120	30-50	90	Imisozi miremire	Umweru, byihanganira Imvura, birwara Kirabiranya
Kazeneza	CIP 393077.159	2018	90-120	30-40	>120	Imisozi miremire	Umweru, byihanganira Imvura, birwara Kirabiranya, biratogoswa, bikorwamo ifiriri
Izihirwe	CIP 396018.241	2018	90-120	30-50	90	Imisozi miremire	Umutuku, yihanganira imvura
Twigire	CIP 392657.8	2020	90-110	30	90	Imisozi miremire	Umweru, byihanganira Imvura, birwara Kirabiranya, bikorwamo ifiriri
Gisubizo	CIP 378699.2	2020	120-150	35	60	Imisozi miremire	Umutuku, yihanganira gacye Imvura, biratogoswa, bikorwamo amafiriri
Ndamira	Shangi	2020	90-100	30-40	< 30	Imisozi miremire	Umuhondo, yihanganira gacye Imvura, bikorwamo ifiriri
Kerekezo	CIP 392797.22	2020	90-110	30	90	Hose (imisozi migufi, imisozi miremire)	Umutuku, yihanganira gacye Imvura na Kirabiranya, bikorwamo amafiriri
Jyambere	CIP 394611.112	2020	100-120	25	100	Imisozi miremire	Umutuku, yihanganira gacye Imvura, biratogoswa, bikorwamo amafiriri
Seka	CIP 398190.89	2020	100	30	90	Imisozi iciriritse	Umweru, byihanganira ubushyuhe n'Imvura, bikorwamo ifiriri

Umugereka wa 2: Urugero rwo gusimburanya ibihingwa

Umwaka	Igihe mbwe	Pariseri 1	Pariseri 2	Pariseri 3	Pariseri 4	Pariseri 5
1	1	Ibirayi	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu	Ibishyimbo	Imboga/ Ibigori
1	2	Imboga/ Ibigori	Ibirayi	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu	Ibishyimbo
2	3	Ibishyimbo	Imboga/ Ibigori	Ibirayi	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu
2	4	Karoti/ Amashu	Ibishyimbo	Imboga/ Ibigori	Ibirayi	Ibinyampeke (ibigori/ingano)
3	5	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu	Ibishyimbo	Imboga/ Ibigori	Ibirayi
3	6	Ibirayi	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu	Ibishyimbo	Imboga/ Ibigori
4	7	Imboga/ Ibigori	Ibirayi	Ibinyampeke (ibigori/ingano)	Karoti/ Amashu	Ibishyimbo

Umugereka wa 3: Ibibazo n'ubutumwa bwo kuzirikana kuri buri gice

Igice	Ingingo	Ibibazo	Ubutumwa bwo kuzirikana
1	Uruhererekane nyongeragaciro rw'imbutu y'ibirayi	<ul style="list-style-type: none"> Kuki imbuto nziza ari ngombwa mu buhinzi bw'ibirayi? Ni gikenewe gukora kugirango utandukanye ibirayi by'imbutu n'ibirayi byo kurya? Ni kihe cyiza cyo kugira ubutubuzi bw'imbutu bwegereye abahinzi? 	Gukoresha imbuto nziza ni kimwe mu bintu yingenzi byongera umusaruro
2	Ibiranga ikirayi cy'imbutu	<ul style="list-style-type: none"> Niyihe ngano (ubunini) nziza y'ikirayi cy'imbutu? Ni ibihe byiciro 4 by'ubuzima bw'ikirayi cy'imbutu? Ni ikihe cyiza cyo kvanaho umumere wa mbere? 	Ikirayi kigeze igihe cyo guterwa, kimeze neza. Kiba gifite imimeru 3-6 migufi, ikomeye kandi ifite ibara.
3	Ubwiza bw'imbutu no kuzemeza	<ul style="list-style-type: none"> Ni gute umutubuzi w'imbutu agirana icyizere n'abaguzi? Ni bihe biranga imbuto nziza y'ibirayi? Ni izihe ntambwe zo kwemeza imbuto? 	Imbutu nziza iba itarangwaho indwara n'udukoko, imeze kimwe, ifite ubunini buto cg bugereranije bwa mm 28-55
4	Gusimbuza imbuto	<ul style="list-style-type: none"> Ni iki gusaza kw'imbutu? Ni ibihe bingahe umutubuzi w'imbutu zemewe zifite icyemezo agomba gutubura imbuto shingiro? Ni hehe imbuto shingiro zoboneka? 	Abatubuzi b'imbutu zemewe zifite icyemezo bagomba gutubura imbuto shingiro bitarenze inshuro ebyiri
5	Kubika inyandiko	<ul style="list-style-type: none"> Nukubera iki kwandika no kubika inyandiko ari ngombwa? Ni ibihe bintu byo gushoraho amafaranga mu butubuzi bw'imbutu? Ni ikihe kinyuranyo kiri hagati y'ibyinjiye byose n'inyungu? 	Kwandika amakuru bifasha umutubuzi w'imbutu kugenzura ibiciro no gusesengura niba ubucuruzi bwe bwunguka

Igice	Ingingo	Ibibazo	Ubutumwa bwo kuzirikana
6	Guhitamo ubutaka no gusimburanya ibihingwa	<ul style="list-style-type: none"> Ni ukubera iki ari ngombwa kwita ku miterere y'ubutaka mu gihe uhitamo ahajya umurima wo gutuburiramo imbuto? Ese ni nibyiza ko utuburira imbuto y'ibirayi ahantu hari hahinzwe ibirayi cg ikindi gihingwa kiba mu muryango umwe n'ibirayi? Ni ibihe bihingwa biba mu muryango umwe n'ibirayi bihingwa mu karere kanyu? 	Abatubuzi b'ibirayi bagomba nibura gutegereza ibihe by'ihinga 4-5 mbere yuko bongera gutubura imbuto y'ibirayi mu murima umwe
7	Gutegura umurima	<ul style="list-style-type: none"> Ni kubuhe bujakuzimu (nibura) ukeneye mu gihe uri gutegura ubutaka? Ni kubera iki gutegura ubutaka neza ari ngombwa mu gutubura imbuto? Ni izihe ngaruka zo gutegura ubutaka ukoresheje imashini? Ni gute wabyirinda? 	Gukoresha imashini mu gutegura ubutaka bigabanya umutwaro
8	Gufumbira (ifumbire y'amatungo, imborera n'imvaruganda	<ul style="list-style-type: none"> Kuki ari ngombwa kugira igipimo cy'ifumbire gishingiye ku karere runaka? Ni izihe fumbire mvaruganda zemewe mu buhinzi bw'ibirayi mu karere kanya? Ni izihe ngaruka zo gutera ifumbire ikungahaye kuri azote? 	Gutera imbuto y'ibirayi ku butaka budafite ifumbire nugutakaza igihe n'ubushobozi
9	Uburyo bwo gutera	<ul style="list-style-type: none"> Niki ugomba gukora mbere y'igihembwe cy'ihinga kugirango wongere umubare w'ibirayi bizarurwa ku gihingwa? Ni iyihe ntera ikwiye mu gutubura imbuto y'ibirayi? Ni gute wategura imirongo yo guteraho ku butaka bufite ubuhaname? 	Imbuto y'ibirayi yangijwe n'indwara n'ibyonnyi ntigomba gukoreshwa mu gutera
10	Kubagara no gusukira itaka	<ul style="list-style-type: none"> Kuki umurima w'ibirayi ugomba guhora usukuye, nta byatsi birimo, kugeza gusarura? Kuki ari ngombwa gusukira itaka? Ni ryari ibirayi bisukirwaho itaka? 	Gusukira itaka ni ngombwa kugirango wongere umubare w'ibirayi, unarinde imbuto indwara n'ibyonnyi

Igice	Ingingo	Ibibazo	Ubutumwa bwo kuzirikana
11	Kuvanamo icyibi	<ul style="list-style-type: none"> Ni ibihe bihingwa bikeneye kuvanwa mu murima? Ni inshuro zingana iki kuvanamo icyibi bigomba gukorwa? Ni iki kigomba gukorwa ku bihingwa birwaye? 	Ku batubuzi b'imbuto, kuvanamo icyibi ni ngombwa cyane kugirango imbuto itangwa mu gihe cyo kwemeza imbuto zihabwa icyemezo
12	Kurwanya indwara y' imvura	<ul style="list-style-type: none"> Ni ibihe bimenyetso by' indwara y'Imvura mu murima? Kanid ni ibihe bintu biyitiza umurindi? Ni ibihe bikorwa by'ingenzi byo kurwanya indwara y'Imvura mu murima? Ni irihe tandukaniro riri hagati y'umuti urinda indwara n'umuti urwanya indwara? 	Indwara y'imvura niyo ndwara izahaza cyane amababai n'imigozi y'ibirayi. Kugira umurima utarangwamo n'indwara y'imvura ni ingenzi mu gutubura imbuto nziza y'ibirayi
13	Kurwanya Kirabiranya	<ul style="list-style-type: none"> Ni ibihe bimenyetso bya Kirabiranya ku migozi n'ibirayi? Ni gute wamenya Kirabiranya mu murima? Ni ibihe bikorwa by'ingenzi byo kurwanya Kirabiranya? 	Nta muti w'ubucuruzi wo kurwanya Kirabiranya. Biragoye cyane kurwanya iyi ndwara iyo yamaze kugera mu butaka
14	Kurwanya Kabore	<ul style="list-style-type: none"> Ni iki Kabore y'ibirayi? Ni gute byairwanya? Ni gute watandukanya Kabore na Kirabiranya? Ni ibihe bikorwa by'ingenzi byo kurwanya Kabore? 	Nta muti w'ubucuruzi wo kurwanya Kabore. Biragoye cyane kurwanya iyi ndwara iyo yamaze kugera mu butaka
15	Kurwanya Imfunyarazi	<ul style="list-style-type: none"> Ni gute imfunyarazi z'ibirayi zikwirakwira? Ni ibihe bikorwa by'ingenzi byo kurwanya Imfunyarazi? Ni ukubera iki ari ngombwa kurwanya udukoko nk'uduhunduguru n'isazi mu butubuzi bw'imbuto? 	Ntaho ari ngombwa kumenya amazina ya virusi. Ikiri ngombwa n'ukumenya itandukaniro riri hagati y'igihingwa kizima n'igihingwa kirwaye

Igice	Ingingo	Ibibazo	Ubutumwa bwo kuzirikana
16	Kurwanya Imungu	<ul style="list-style-type: none"> Ni iki Imungu y'ibirayi? Ni bihe bimenyetso by'imungu y'ibirayi mu kigega? Ni ibihe bikorwa by'ingenzi byo kurwanya Imungu mu kigega? 	Gusukira itaka neza ni ingenzi mu kurwanya ubwandu bw'imungu y'ibirayi
17	Kurwanya amavunja y'ibirayi	<ul style="list-style-type: none"> Ni iki amavunja (nematode) y'ibirayi? Ni ibihe bimenyetso by'amavunja y'ibirayi? Ni ibihe bikorwa by'ingenzi byo kurwanya amavunja y'ibirayi? 	Amavunja y'ibirayi aragora kuyarwanya iyo yageze mu butaka. Ingamba zo kuyirinda nibwo buryo bwa ngombwa mu kuyarwanya
18	Kunyumora	<ul style="list-style-type: none"> Ni kuki ari ngombwa kunyumora imbuto z'ibirayi mbere yo gusarura? Ni gute umutubuzi w'imbutu yamenya igihe cyiza cyo kunyumora ibirayi? Ni ubuhe buryo butandukanye bukoreshwa mu kunyumora ndetse n'ibihe byiza cyangwa bibi bya buri buryo? 	Kunyumora bituma uruhu rw'ibirayi rukomera kandi ni ingenzi mu bwiza bw'imbutu y'ibirayi
19	Gusarura, Gutoranya no gutondeka ibirayi	<ul style="list-style-type: none"> Ni ikihe gihe cyiza cyo gusarura imbuto y'ibirayi? Wabasha kukimenya gute? Ni rihe tandukaniro riri hagati yo gutoranya no gutondeka ibirayi? Ni iki wakoresha ibirayi byavuye ku bihingwa birwaye? 	Ibirayi by'imbutu bigomba kwitabwaho neza mu gusarura. Gukomereka w'ibirayi gutuma ubwiza bw'imbutu bugabanuka
20	Guhunika imbuto y'ibirayi	<ul style="list-style-type: none"> Ni ubuhe buryo bwiza bwo guhunika imbuto y'ibirayi ku batubuzi b'imbutu? Ni ibihe bikoresho bikenerwa mu kubaka ikigega kinjiza urumuri? Ni iki kigomba gukorwa ngo hirindwe ikwirakwira ry'indwara n'ibyonnyi mu kigega? 	Guhunika imbuto y'ibirayi mu kigega gifashwe neza cyinjiza urumuri (DLS) bizatuma imbuto izana imimero migufi, ibyibushye, ifite ibara kandi itanduye indwara n'ibyonnyi

Umugereka wa 4: Urugero rw'isuzumabumenyi rya mbere na nyuma y'amahugurwa

Isuzuma bumenyi ku buhinzi bw'imbutu y'ibirayi

izina: _____

Itariki:

--	--	--

Note: Each good response equals 1 point out of 20

Isomo rya1

Iby'ibanze ku butubuzi bw'imbutu y'ibirayi

1. Kuki ari ngombwa ku bahinzi gukoresha imbutu nziza y'ibirayi?

2. Ni ibihe byiciro 4 by'ubuzima bw'ikirayi cy'imbutu? Ni bihe bimenetso biranga imbutu nziza y'ibirayi?

3. Ni bihe bimenetso biranga imbutu nziza y'ibirayi?

4. Ni iki gitera gusaza kw'imbutu?

5. Sobanura uburyo bukwiye bwo gusimbura imbutu ku bataubzi b'imbutu zemewe zifite icyngombwa?

Isomo rya 2 Ubutaka no kwita ku gihingwa

6. Ni hehe mu isambu hategetswe gushyira umurima wo gutuburiramo imbuto nshya?

7. Sobanura uko gusimburanya ibihingwa bikorwa ku butaka butuburirwamo imbuto

8. Ni izihe fumbire mvaruganda zemewe mu buhinzi bw'ibirayi mu karere kanyu? Ku ruhe rugero?

9. Ni iyihe ntera ikwiye mu gutubura imbuto y'ibirayi?

10. Kuki ari ngombwa gusukira itaka ibirayi?

11. Ni ibihe bikorwa mu gihe cyo kvanamo icyibi?

Isomo rya 3 Kurwanya indwara n' ibyonnyi

12. Ni irihe tandukaniro riri hagati y'umuti urinda indwara n'umuti urwanya indwara?

13. Ibihe bikorwa by'ingenzi byo kurwanya Kirabiranya?

14. Ni gute watandukanya Kabore na Kirabiranya?

15. Ni ibihe bikorwa by'ingenzi mu kurwanya indwara z'imfunyarazi?

16. Ni ibihe bimenyetso by'imungu y'ibirayi mu kigega?

17. Ni ibihe bimenyetso by'amavunja ku kirayi?

Isomo rya 4

Gusarura no kubungabunga umusaruro

18. Kuki ari ngombwa ku mutubuzi w'imbuto kunyomora imbuto y'ibirayi mbere yo gusarura?

19. Ni gute umutubuzi w'imbuto z'ibirayi yamenya igihe cyiza cyo gusarura?

20. Ni ibihe bintu by'ingenzi biranga ikigega cyinjira urumuri ku mbuto y'ibirayi?

